The Builder.

VOL. LXXXIX.—No. 3280. DECEMBER 16, 1905.

ILLUSTRATIONS.

Decorative Painting: "Flora's Bower" ..... By Mr. Robert Christie.
Roman Masonry at Pevensey ..... From Photographs.
Sketch Plans for Residence at Buenos Aires } ..... Mr. Leonard Nagington, Architect.
Plan of Gardens for Residence at Buenos Aires }

Illustrations in Text.

House at Buenos Aires: Perspective Sketch ... Page 646 | Illustrations to Student's Column ..... Page 651

CONTENTS.

	PAGE
Roman Masonry at Pevensey	633
Notes	634
The Royal Academy Students' Work	637
The Architectural Association	638
Intention in Ornament	641
Tests of Open Domestic Fire Grates	642
Conference on Smoke Abatement	643
The Institute of Sanitary Engineers	644
Payment of District Surveyors by Salaries	645
Fifty Years Ago	646
Illustrations:—	
Decorative Picture: "Flora's Bower"	646
Roman Masonry at Pevensey	646
Proposed House at Buenos Aires	646
The Surveyors' Institution	647
The London County Council	647
Applications under the 1894 Building Act	648
The Architectural Association Discussion Section	649
Engineering Societies	649
Books Received	649
Correspondence:—	
"Standardising" Bills of Quantities	649
"Painters' Architecture"	650
Preston Higher Grade School Competition	650
Wanted—A Fire-Resisting Stone	650
A Question of Construction	650
The Tribunal of Appeal under the London Building Act	650
Isolation Hospital, Rotherham	650
The Student's Column	651
Obituary	652
General Building News	653
Sanitary and Engineering News	654
Miscellaneous	654
Legal:—	
Action by a Builder	654
Action by the Silicate Paint Company against Painter and Decorator	655
Patents	655
Some Recent Sales	656
Meetings	656
Prices Current of Materials	656
Tenders	657
Competition, Contracts, and Public Appointments	658

Roman Masonry at Pevensey.

THE outer walls of the extensive ruins popularly known as Pevensey Castle present as good an example of Roman masonry as is to be found in the kingdom. The late Mr. Charles Roach Smith, F.S.A., the greatest Roman antiquary of his day, considered Pevensey to be among the most remarkable of our national monuments. "Of all the Roman-walled castra in England," he writes, "that of Pevensey presents the highest claims to our admiration. It is among the largest in extent, enclosing upwards of 9 acres; it is the best preserved; and approached by the high road, either from the east or the west, its appearance is grand and imposing." It is now some years since the above remarks were written in the "Report on Excavations made upon the Site of the Roman Castrum at Pevensey, in Sussex, in 1852," but it is unquestionably as true to-day, as it was then, that the masonry of the Roman walls in this imposing structure is of extraordinarily fine character, and has been preserved in a remarkable manner.

In plan the walls at Pevensey are irregular, and it is difficult to decide in our own mind whether they approach more nearly to an imperfect oblong or an imperfect oval form. This is a point, however, upon which it is unnecessary to enter here, as the purpose of this article is to draw attention to certain details of the masonry of the walls and the materials of which they are built.

Most visitors probably approach Pevensey Castle from the south-west—a route which affords an excellent general view of the main or decuman gateway. Lofty flanking towers or bastions stand on each side (see lithograph plate, *Fig.* 1), and although they have suffered somewhat from the depredations of persons in want of building materials, they both are wonderful examples of the solidity of Roman masonry. The tower on the left hand or northern side (*Fig.* 2) is particularly instructive, inasmuch as it shows a practically complete series of considerably more than fifty courses of facing stones, etc., and also, where the facing stones have been torn off, some excellent sections are seen of the rubble core of which the solid mass of the bastion or tower is composed.

It is noteworthy that, whilst the mortar used with the facing stones is of that pink hue arising from admixture with pounded tile or brick, usually regarded as one of the characteristic features of Roman masonry, the mortar employed with the internal flint rubble is composed of lime and sea-sand, without any admixture of tile, and presents a decidedly colder tone than the pink mortar close by. These two flanking towers stand 27 ft. apart, a space almost equal to their height, but the excavations of Messrs. C. Roach Smith and M. A. Lower revealed a recessed wall leading internally to an arched entrance a little over 9 ft. wide.

This northern tower contains some excellent examples of Roman put-log holes placed at parallel stages about 4 ft. 6 in. apart, and at intervals laterally of slightly over 2 ft. The tower also gives some useful information as to the way in which its courses of facing stones coincide with those of the actual wall, leading to the conclusion that both are parts of the same great work, and that both were built at the same period (*Fig.* 3).

The plan of the bastions is somewhat peculiar, approximating to a semi-circle attached to a square; they measure, roughly, 30 ft. in depth by 20 ft. in width. Both bastions and walls originally reached a height of between 24 ft. and 30 ft.; whilst the walls have a thickness varying from 10 ft. to 12 ft.

The walls of Pevensey are remarkable in being, in some parts, as complete as they were originally built by the Romans. Perhaps one of the best sections now visible is the portion of the wall on the north-north-west side, shown in *Fig.* 4. Here, for a considerable space not covered with ivy, we find the facing stones remaining in about fifty-five complete courses with the precision and regularity of brickwork, but without the irritating and monotonous effect caused by the uniformity of that material.

A well-defined feature of this part of the wall is a single course, at about 9 ft. from the ground, of red tiles 3½ in. thick, and averaging about 12 in. long. Apparently these are square tiles, and they approach more closely to the forms used for the building up of pilæ in hypocausts than to the regular so-called

bonding tiles. Immediately above these tiles is a course of well-squared stones of the uniform thickness of 6 in., but of various lengths, ranging from 6 in. to 1 ft. 2 in. Two double courses of bonding tiles occur at intervals of a little over 4 ft. in the wall above, and between them, about 3 ft. below the top of the Roman wall, is a line of well-defined put-log holes 8 in. square and placed at intervals of nearly 3 ft. apart (*Fig.* 6). Traces of put-log holes in the lower part of the wall may be seen in the arrangement of the masonry, but they have generally been filled up by the builders. The top range, however, which would serve for the support of the scaffolding used for the completion of the upper part, were suffered to remain open, and so they exist to-day just as the Roman builders left them. This part of the wall has the additional interest of showing a piece of later walling built on the top of the Roman wall. It consists of nine or ten courses of rough flint work, and is probably of the time of Edward I.

One of the bastions almost at the north end of the building shows considerable evidence of rebuilding in herring-bone work, which was probably executed by the Normans. In another bastion, quite near the main gateway (*Fig.* 5), there is an interesting little patch of mending of the same character and period in which only six or seven stones are employed, but these also are placed diagonally in a single row so as to fill up the space left by the falling or removal of two or three Roman blocks.

Before leaving the subject of the bastions at Pevensey it may be pointed out that they are constructed of solid rubble, and were evidently intended to serve both as watch-towers and as platforms for the military engines in vogue at the period when they were built. During certain excavations within the area of the mediæval works at Pevensey a number of balls of stone from the local green-sand were discovered. These were spherical in shape, and of various sizes, and probably they are the actual missiles used, or intended to be used, with the engines on the bastions.

The bonding tiles have already been mentioned. They occur in double, triple, and in one bastion in quadruple courses at irregular heights in the masonry. They do not in all cases appear to be continued far into the wall. It is just possible that they may have been intended to tie the facing of squared stones to the rubble core behind, but, if so, that appears to have been an entirely unnecessary precaution, because the junction of the two is so perfectly effected by the excellent mortar employed that even now the squared stones are very firmly fixed to the wall. At a good many points, within easy reach from the ground, the facing stones have been torn off, leaving the rubble work exposed; but this has been accomplished apparently only by the use of violent means, and it must be remembered that the walls of Pevensey have for centuries served as a sort of quarry for the supply of building materials. Indeed this barbarous practice was continued until about the year 1833.

To anyone who closely examines the walls it must be clear that the materials employed and the method of their arrangement both point to efforts towards a rude scheme of colour decoration. The local stone from the green-sand formation, of which the main parts of the outside of the walls and bastions are composed, is of a greyish tint, and sometimes almost of a cream colour. At various heights in the wall blocks of stone of warm reddish brown colour, sometimes approaching a rich purple tint, and of rather large size, are inserted in the masonry. These darker stones occur in triple layers in some of the bastions, and are continued in the walls, where they form a prominent and effective feature. It can hardly be doubted that their purpose is decorative, because they are arranged in such a manner as to produce a strong effect, and are obviously placed so that the maximum of their surface is displayed. In the western bastion of the main gateway this is well shown.

Other examples of the use of almost, if not quite, identical stones in Roman masonry occur in the water-gate at Porchester Castle, and at various parts of the Roman wall of London.

There are two striking things about the Roman masonry at Pevensey which must be obvious to anyone who visits the ruins, or even only glances at the accompanying photographic illustrations. These are the solidity and the finish of the masonry. The former is well illustrated in many other Roman remains; but the latter is rarely, if ever seen, in this country in such perfection. Most of the facing stones of our Roman walls have been destroyed or seriously damaged, and the association of the two features here gives to Pevensey a special value for students who wish to understand at once the thoroughness in broad outline, as well as in minute detail, with which the Romans constructed their masonry.

It may be added that the photographs represent the actual condition of the masonry as it was a few months since.

NOTES.

London Fog and Smoke.

THE experience of the last few days should have the effect of stimulating interest in the Conference on Smoke Abatement, which commenced on Tuesday, under the auspices of the Royal Sanitary Institute and the Coal Smoke Abatement Society. So far as the metropolis is concerned, the chief factor in the smoke problem is the domestic fireplace, or stove, as it is technically described. We do not mean to imply that factory chimneys in London are less energetic in wrong-doing than their *confrères* in the provinces, but simply that their most vigorous efforts to encumber the air are as nothing compared with the enormous volumes of smoke issuing from the throats of thousands upon thousands of chimneys in dwelling-houses and other buildings. The employment of producer-gas in substitution for coal, as suggested in the paper by Mr. Ackermann, would certainly have a good effect if people could be persuaded to give up the wasteful, inefficient, and delightful coal fire. We do not think persuasion is of the least use in this case. The coal fire is not valued for its warmth alone; it is looked upon as the centre of the family circle, as an excellent substitute for the waste-paper basket, and as a most convenient means of light for cigars and pipes. The familiar fire is almost as much a companion as the friendly dog and the necessary cat, and it is improbable that the reformers who would banish it will find much more than theoretical support from the people at large. Practical benefit is far more likely to result from efforts to improve the design of domestic stoves. The tests recently conducted by the Coal Smoke Abatement Society show that great differences exist between various kinds of grates, and the publication of the results, together with those of the investigation now being made in connexion with the furnishing of the new Government buildings in Whitehall, will be of distinct value for the guidance of architects and others in the selection of firegrates for domestic use.

Municipalities and Power Gas.

WHEN a trading company makes an unsuccessful venture, or suffers severely from unexpected competition, the position is not pleasant for the shareholders, but it is the fact that the only sufferers are capitalists who have voluntarily decided to run a certain risk in the hope of a large return. Ratepayers who underwrite and pay interest on the capital for municipal enterprises of commercial character are not in a similar position. Most of them are dragged in against their wish, and none of them expect to derive any return for their money. A strong hint as to the risky nature of municipal trading is afforded by a recent report of the gas committee of the Birmingham City Council. Owing to the severe competition of producer-gas, a further reduction is now recommended in the charges for power-gas from the Corporation works, and the committee state that if, as seems probable, manufacturers decide to adopt gas-producer plants in large numbers, a very considerable loss will be sustained by the ratepayers. Since the introduction of the suction type-producer, makers of gas-producing plant have been exceedingly busy, and there is just ground for believing that the Birmingham and other municipal gas and electricity works will be prejudicially affected. Risk of the kind is inseparable from all commercial undertakings, from which public bodies would do well to abstain, especially in view of the rapid, and sometimes unexpected, developments of modern engineering practice.

The Electric Lighting of the City of London.

THE paper read to the Institution of Electrical Engineers by Mr. W. H. Patchell, on the City of London Works of the Charing Cross Company, is of value, as it shows what can be done by electricians in transmitting power at high pressure by underground mains. The Charing Cross Company obtained a Provisional Order for supplying electricity within the City of London area in 1899. The nearest suitable site that could be found for a generating-station was at Bow, about four miles from the Bank of England. It was decided to supply the sub-stations in the City with

three-phase currents at 10,000 volts. In order to obviate the complication introduced by transformers, the generators were built so as to produce this pressure directly at their terminals. One of the generators has an output of over 5,000 horse-power, and is coupled directly with a large reciprocating engine. It will be interesting to compare the results obtained by this engine with the results obtained by the steam turbines of corresponding size which are now almost invariably used to drive large dynamos. The electric power is transmitted by ten "feeder" mains, which are all lead-sheathed and insulated with paper. The mains are laid on the solid system in steel troughs, which are heavily bonded. We are told that the bonding has been done in order "to comply with the Board of Trade requirements." We presume, therefore, that the author does not approve of this particular requirement of the Board of Trade. It may perhaps be unnecessary in this particular instance, but in the interests of public safety we approve of this rule. Apparently very little trouble has been experienced with the 70 miles of this high-pressure cable which have been laid. This is a sufficent answer to the main argument of those electricians who are agitating, and in many cases successfully, for permission to erect overhead wires conveying currents at high pressures. The electrical machinery employed at the Bow station is mainly of the Continental type, and is deserving of high praise. We agree with the author in thinking that the dynamos are a good illustration of "elegance of design, combined with solidity and stiffness of construction."

Damages for Causing Subsidence of Streets.

THE streets which were highways repairable by the inhabitants at large in urban districts are by sect. 149 of the Public Health Act, 1875, vested in the urban authority, but it has been decided by the House of Lords, in the case of Mayor, etc., of Tunbridge Wells *v.* Baird, in 1896, that under this section only so much of the surface of the streets is vested in the local authority as shall enable the street to be maintained as a street. By sect. 27 of the Highway and Locomotive Act, 1878, the right of individuals is preserved to work and get minerals under the highways as long as no damage shall be done to the highway. In the case of the Mayor, etc., of Wednesbury *v.* Lodge Holes Colliery Company (current *Law Reports*), an interesting decision has been given as to the proper measure of damages when injury has been caused to the street. The defendants by mining operations had admittedly caused a serious subsidence in one of the roads, and the local authority claimed as damages the amount expended, some 400*l.*, in restoring the road to its original level; the defendants alleged that the road could be made as commodious for the public as it was before with an expenditure of 65*l.*; and the court held that the rights of the plaintiffs in the road only made this latter the amount of damages recoverable from the defendants. It is important for local authorities to remember that their ownership of the streets is limited, and that for them to carry on operations below the surface special Parliamentary powers are required. Such special powers are often conferred upon them, as, for instance, in the case of sewers, and as to public conveniences, in reference to which we commented in our issue, July 29, 1905, on the case of London, North-Western Railway *v.* Mayor, etc., of Westminster, but in the absence of special Parliamentary authority their ownership of the streets is confined to the surface, as above stated.

The Wall Failure at Croydon.

ALTHOUGH completely overshadowed by the Charing Cross catastrophe, the collapse of a wall last week at the Croydon Palace of Varieties was sufficiently serious to demand attention. At the time of the accident the roof and all interior details of the theatre had been removed, leaving nothing but the shell, and the contractor had commenced to build a 9-in. wall, intended to strengthen the 14-in. western wall of the structure. The outer wall measured about 60 ft. long by 32 ft. high, and when the new work had been carried up to the height of 15 ft. the upper portion of the old wall fell inward without warning, carrying the scaffolding with it and burying nine men beneath the *debris*. Unhappily one man was killed, but the others were fortunate enough to escape with more or less serious injuries. From the evidence given at the coroner's inquest it appears that the two walls were 10 ft. apart, the scaffolding being between them, and it is significant that the clerk of works had noticed a week before "that the intervening space was getting small." The use of a plumb-line showed the top of the wall to be 3 in. out of the perpendicular, but whether this represented recent movement or long-standing settlement we do not know. If the contractor did not know, the application of shoring would be an obviously desirable precaution, for although an inclination of 3 in. in a height of 32 ft. is not necessarily dangerous, it would be so if caused by the cutting away of brickwork for tying the two walls together. The contractor's manager stated that chases had been cut in the old brickwork 4½ in. deep by 12 in. high by from 2 ft. to 5 ft. wide, and 2 ft. apart vertically. He also admitted that the piers—1 ft. 9 in. thick and spaced 10 ft. apart—had been cut into to the extent "of 2¼ in each bond." The clerk of works stated that an ornamental bond course existed at the height where the wall broke, "and there was not a proper bond." All these things taken together ought to have suggested the necessity for efficient shoring, and we fully agree with the opinion given by the majority of the jury "that more precaution should have been taken in shoring up the wall."

Concrete Mixers.

IN the paper read by Dr. J. S. Owens, A.M.Inst.C.E., at the last meeting of the Civil and Mechanical Engineers' Society, a very useful summary is given of machinery and other appliances for gauging the ingredients of concrete and for the subsequent mixing of the materials. The ordinary method of gauging by hand consists in filling the ballast and cement into receptacles of known capacity, the quantity of water being determined by observation. This evidently gives full scope for the personal factor, and favours variations of consistency. It is not altogether easy to devise a gauging machine that will perform the required functions in a satisfactory manner, and the result is that several of the appliances described by the author represent compromises between hand and mechanical gauging. One of the most ingenious devices of the kind is the Trump measuring machine, in which the material is distributed from a vertical cylinder in a thin layer upon a revolving table, and a stationary blade diverts a continuous stream of the mixture into a shoot placed below the edge of the table. It is said that the results of the Trump machine are as accurate as those given by the hopper scale. Numerous types of continuous, batch, and gravity concrete mixers are described, among the last-mentioned class being a mixer devised by the author. This apparatus combines certain new principles, and consists of a shoot with baffle plates and a series of spring bars intended to deflect the material in opposite directions as it falls from each baffle. This is a very simple apparatus and seems likely to give good results. For mixing concrete to be delivered below ground level it could be employed with very economical results.

White and Red Lead Adulteration.

IT is well known that white and red lead heavily adulterated with barytes and other inferior substitutes are frequently sold as genuine articles. To check this adulteration the White Lead Section of the London Chamber of Commerce are prepared to examine and report on, free of charge, any white or red lead bought as "best," "genuine," or under other description indicative of commercial purity. Any person purchasing white or red lead of this description may send a sample, weighing about half-a-pound, for analysis to "The Inspector," White Lead Corroders' Trade Section, London Chamber of Commerce, Oxford-court, E.C. The Section point out that it is a breach of the Merchandise Marks Act, 1887, to sell adulterated white or red lead under such terms as "best" or "genuine," and that they have obtained several convictions in different parts of the country against firms selling adulterated white and red lead thus described. Small dealers and retail shopkeepers when purchasing genuine white or red lead should take the precaution to see that the material is described as genuine either on the keg or on the invoice, so that should it be found to be adulterated proceedings may be taken against the vendor.

Shrewsbury School.

THE fire which broke out on December 5 destroyed the roof and the upper part of the school building, but the chapel and school-house were untouched, and the early entrance-books, carrying the records back to Queen Elizabeth's days, together with the most valuable MSS. and volumes in the old library have been saved intact. In 1881 the school migrated from its original home to Kingsland, on the south side of the Severn, where the governors had bought 26 acres

of land and what was then known as the House of Industry, which had been built in 1765 at a cost of 12,000*l.* as a branch establishment of the Foundling Hospital, London. The hospital was soon afterwards opened as a woollen manufactory for the employment of the children of the poor. During the war with America it was rented for the confinement of prisoners of war; then, in 1784, the Union Guardians purchased it for parochial purposes. The governors of the school made extensive additions to the buildings, comprising the large schoolroom, classrooms, six boarding-houses, chapel, in the Early English style, and headmaster's house, in the "Queen Anne" style, designed by Sir Arthur Blomfield. One of two houses for assistant masters, by William White, is illustrated, and with plans, in the *Builder*, of September 10, 1881. When vacated by the school the former school buildings were taken for uses of the Free Library and Museum. The greater portion of them were built at, or soon after, the time of the augmentation of the foundation by Queen Elizabeth in 1572. They formed two sides of a quadrangle having square turrets with pinnacles at the angles, together with a chapel, over which was the library, rebuilt in 1815. The old school-house is illustrated in our columns of August 22, 1891; over the entrance were set up quaint figures of two schoolboys in the dress of the time.

Church of the Holy Trinity, Gough-square, E.C.

A SCHEME has been formulated, under the Union of Benefices Acts, for uniting the benefices of St. Bride, Fleet-street, and Holy Trinity, Gough-square, and for selling the materials and site of the church of the latter for the erection of a new church in the suburbs. The parish of Holy Trinity was taken out of that of St. Bride seventy years ago, when the number of inhabitants of St. Bride's parish and the extra-parochial precinct of Whitefriars amounted to about 8,200, of whom the parish church could accommodate only 1,500 persons. Bishop Blomfield and the rector, the Reverend Thomas Dale, moved for the erection of another church. The necessary funds having been provided by grants from the Church Commissioners and the Metropolis Churches' Fund and by subscriptions, the Goldsmiths' Company presented a site at the corner of Pemberton-row and Great New-street, near Gough-square. The site being a small one and triangular in shape presented considerable difficulties to John Shaw, the architect, who however succeeded in rendering the whole space available and built a church containing 1,100 seats (there are now much less) at a contract, by Haward & Nixon, of Stangate, Lambeth, for 3,887*l.* The church was built, in 1837-8, of yellow brick, and has a tower about 80 ft. high, designed after the Anglo-Norman manner. The plan comprises a hexagon 47 ft. 6 in. in diameter, with a large octagonal recess for the chancel, and two similar recesses, for pews, on the north-east and south-east sides. Two galleries, supported by iron columns, surrounded the interior except on the east side over the chancel, where was one gallery. The stained glass in the three circular-headed windows of the chancel was executed by Willement. The interior was decorated in 1876, having been rearranged three years previously by Sir Arthur Blomfield.

The Value of Pageants.

THE lecture given by Mr. Parker at the Society of Arts on Tuesday evening, under the title "Historical Pageants," turned out, as he confessed, to be out of keeping with its title, as it contained no general review of the subject. But it was something better; it was an explanation and illustration of the real value of historical pageants, like that held recently at Sherborne under Mr. Parker's own management, in enabling people to realise the past history of their town, and that the men and women whose names figured in the pages of that history were not mere historical ideals, but men of like passions and like nature with themselves. Mr. Parker spoke with most effective eloquence at the commencement of his lecture on the indifference of average people to the history of the places in which they lived—how many people, in London, he said (with only too much truth), could answer if you stopped them in the street and asked why this neighbourhood was called "Adelphi"; why the Abbey was called "Westminster"; how the Strand, and Fleet-street, and Blackfriars, and the Temple, and many other places, came by their names. The Pageant at Sherborne had had the effect of teaching those who saw it and those who acted in it what was the history of their town, how great and far-reaching were its associations in the past; of taking them out of the mere prose of everyday occupation and fixing their attention on the long past and on the possible future of their city, awakening a local patriotism which might have wide-spreading effects. But for this end, he would not have considered the Sherborne Pageant worth the immense trouble and the considerable sums it cost; but the object was to assist people to realise the events and the characters of history. Mr. Parker entirely carried his audience with him; and, viewing a pageant in this light, we quite agree in his appreciation of its value. The lecture was followed by a series of lantern views and living pictures of the Sherborne Pageant.

The Leicester Gallery.

AT the Leicester Galleries there is an exhibition of works by Mr. Charles Conder, who has been taken up as a fashion by ultra-modern critics—or those who call themselves such. His feeling for colour is shown in some of the fan-designs and in some others of the exhibits, such as "The Rose Garden" (14); and his two oil sketches of Brighton Beach under two aspects (18 and 25) are good as sketches on a large scale. For the rest, we see a great many crude sketches of nude figures very imperfectly drawn, and fantastic groups of clothed figures which are vulgar in sentiment and totally devoid of artistic attraction. We have seldom been in a roomful of pictures and drawings which we were so glad to leave. In the adjoining room a collection of paintings by M. Jacques Blanche contains figure-studies which show what the French call *chic*—a certain spirit and vigour in studies of figure and costume from very unattractive models—for in the ultra-modern school of art beauty in figure subjects seems to be a weakness to be carefully shunned; but his flower-paintings are admirable; the large one especially, entitled "White Peonies and Silver Urns" (12), is a really fine work of its class. A set of small oil-sketches by Mrs. Edmund Davis, under the general title, "Landscape Notes and Sketches," contains some good suggestions for pictures; "Storm-swept" (4), a group of thin trees in a waste bit of country, is one of the best; "Summer Evening" (18), "Lowlands" (21), and "Poplars, Normandy" (23), are also noticeable as suggestions in landscape composition.

The Baillie Gallery.

AT Mr. J. Baillie's new Gallery in Baker-street there is a collection of paintings and drawings by the late Mr. Simeon Solomon, whose art appears to be, to a great extent, a kind of echo of Burne-Jones. There is a good deal of beauty both of design and colour in many of his works. "Many Waters Cannot Quench Love" (23), in which a nude figure of Love with crimson wings floats in the air, is a lovely design; "Love in Autumn" (27) is a work of kindred spirit. A pencil study of a good many figures, entitled "Behold the Bridegroom Cometh" (25) seems to have been designed rather under the influence of Blake—the two figures floating in the air above the principal group have a very decided look of Blake, except that they are better drawn than was usual with that mystic genius; while the draped figure entitled "Memoria" (41) looks like a monochrome study after a Burne-Jones figure. Thus there is a kind of pervading reminiscence of the work of other artists in the collection: and the half-length of "Sir Galahad" (7), beautiful enough in its way, has just the fault of Burne-Jones's conceptions of Arthurian knights, in being far too pretty and feminine in the type of head. There is however much that is interesting in the exhibition. Among other things to be noted are the "Hebrew Maiden Lamenting" (5), a beautiful and expressive head; "Et Lux in Tenebris Lucet" (29), a very faint and delicate crayon drawing of a nude figure; "Hebrew Maiden" (58), a panel study of a head; and "A Vision" (61), three heads drawn on toned paper. The exhibition as a whole is worth seeing.

Arts and Crafts Club.

UNDER this title the first exhibition of the club is held at the Modern Gallery in Bond-street. It consists of a number of small works, chiefly landscape studies, not for the most part of a very high degree of interest. Among those which are above the average are Mr. Jeffcock's two admirable sketches, "View of Runton" (6) and "Farmstead near North Walsham" (11); we may mention also Mr. Pinhorn Wood's "Autumn" (25); Mr. Haddon's figure-study, "A Sower, Segovia" (39); Mr. J. H. Hale's "The Wind and Rain" (40); Mr. Haddon's "Old Houses by the Tagus" (43); Mr. S. Reid's "The Rustic

Bridge" (44); Mr. Hamilton Jackson's "The Old Bridge" (116) and "By the Sea" (187); Mr. Joseph Powell's "A Lane near Chichester" (126), a very fine landscape sketch; and Mr. Rawlence's "An Ilex Grove" (185), with old stone statues dimly seen among the mass of dark foliage. A pastel entitled "Dawn" (176), by Mr. Lionel Heath, showing a nude figure in a wood with the first streaks of sunlight behind the trees, is a good composition with a well-drawn figure. In Mr. T. Browne's "Jumping" (68) the drawing of the man in the act of jumping is clever and vigorous, but the endeavour to convey the idea of his jumping out of the picture by drawing one hand on the edge of the mount is a foolish piece of trickery unworthy of an artist.

The Dutch Gallery.

At the Dutch Gallery in Bond-street is a collection of landscapes in oil by P. J. C. Gabriel, mostly good in composition but heavy and dull in colour. Among the exceptions is the small picture entitled "A Cornfield" (34), a very fine little landscape; and the larger one hung beneath it, "Evening" (2) is an effective work showing an unusual scheme of colour. Among the best of the others are "Rainy Weather" (3); "Morning" (4); "A Stream" (5), good in composition but the foliage too black and loaded in effect; "Early Morning" (22); and "The Village Church" (7), a pretty landscape composition, only the church tower is not upright.

The President of the "A. A." "At Home."

The smoking "At Home" given by Mr. Guy Dawber, the President of the Architectural Association, at Tufton-street last Friday, was a new feature in the Architectural Association meetings (no doubt suggested by those recently given at the Institute), and was very successful. There was a large attendance of members, and a beautiful collection of drawings were hung round the walls, contributed by many members, older and younger. Among them were Mr. Spiers's drawings of the interior of St. Sophia, the opportunity for making which was obtained by the *ruse* of pretending to be the assistant of the Sultan's official photographer. Among the other contributors were Mr. Prentice, Mr. Horsley, Mr. A. H. Hart, Mr. Ernest George, Mr. Needham Wilson, Mr. Arnold Mitchell, etc., etc. There was some glee-singing and some solo-singing, also some pianoforte; but while a bell was rung for silence for the singing, we observed that no such signal was given for the pianoforte playing, which was seen but not heard amid general conversation. That is a kind of Philistinism which the Association, if it professes to be an artistic Society, ought to get rid of. We remember the time when everyone talked in drawing-rooms during a pianoforte piece, but in London drawing-rooms at the present day that is considered "bad form," and the Association is behind the age in countenancing it. It is degrading the art of music (and of playing) to make it a mere accompaniment to conversation.

A French Compliment to Mr. Spiers.

On Saturday last the Académie des Beaux-Arts elected Mr. R. Phenè Spiers as "Membre Correspondent" of the Institut, in place of the late Mr. Alfred Waterhouse. Mr. Spiers's French education in architecture, and his personal acquaintance with many eminent French architects, would render him no doubt a peculiarly desirable Honorary and Corresponding member from their point of view, while Mr. Spiers's English friends will be ready to testify that the Académie could not have elected any Englishman more learned in architecture.

THE ROYAL ACADEMY STUDENTS' WORK.

The designs by the students of the Royal Academy have been, as usual, open to the public for inspection on the two days following last Saturday's award of the prizes. The subject set for the Gold Medal and Travelling Studentship in Architecture was "A British Embassy in a Foreign Capital"; a very good subject. The medal has been won by Mr. Leslie Wilkinson, for a design which is certainly the best in planning. In architectural treatment the exterior is perhaps a little too quiet and unassuming for the supposed class of building. The intention has perhaps been to render the English building a contrast to the more florid architecture which would probably be characteristic of a hotel for a German or French Embassy; it is an exceedingly plain square building with little decorative detail, except that the upper portion of the centre shows a classic colonnade behind which the wall is recessed. Presumably this is intended to be the residential portion, and is not shown in the plans, which show only the ground floor and first floor of the Embassy proper; the smaller rooms for business below, the large suite of entertaining rooms, planned with great dignity, on the first floor. The points in which the superiority of planning is shown are chiefly in the arrangement of the smaller rooms on the ground floor, and especially in knowing how to place the lavatory apartments, a small but important matter in which both the other competitors have failed. The windows of the entertaining rooms on the first floor hardly suggest, from their treatment, that they belong to so important a ceremonial suite. There is a powerful cornice carried round the building, of 6 ft. projection; in the perspective view the projection appears rather too great in proportion to the depth of the cornice. The exterior design of No. 175 seems to us on the whole more palatial in character and more suited to an Embassy than in the prize design; but taking plan and design together there is no doubt that Mr. Wilkinson rightly won the medal. He has been successful also in the "Set of Architectural Designs" (25*l.*), which seems rather to be a set of drawings of one design—for a garden pavilion, rather in the style of Wren, and very satisfactorily treated. No. 182 shows a good treatment of a similar subject. "Set of drawings of an Architectural Design" (15*l.*) is won by Mr. A. A. Carter with a very pretty set of drawings for a group of almshouses, treated in what may be called cottage style, with a perhaps rather exaggerated simplicity. We should be disposed to call the second prize design, for the same subject, by Mr. W. Harvey, a better building, but it has not quite so marked a character. Mr. W. Harvey also takes the 10*l.* prize for "Original Composition in Ornament," shown in a plaster model which is a very good bit of work. The silver medal for measured architectural drawings is given to Mr. A. A. Carter for a very good set of drawings of the Hall of the Charterhouse; Mr. Brooker obtains a second prize for the same subject; he seems to be equally careful, but his drawings are not nearly so attractive in method of execution. Two subjects in the architectural section have elicited no competition—"Perspective Drawing in Outline" (the subject given being the Roodloft of the Church of Bois-le-duc, in the South Kensington Museum), and "Architectural Design with Coloured Decoration," the subject given being "A Mosaic Pavement for the Hall of a Fishmongers' Company." It seems surprising that so fascinating a subject should have attracted no one.

In a corner of Gallery IX., rather out of the way, is hung a collection of the drawings executed by the Architectural Travelling Student of 1905, Mr. Lionel U. Grace. These are of the highest excellence, and form a most varied and careful set of illustrations of many interesting buildings abroad chiefly Italian, including some which have not been much illustrated. We understand that Mr. Grace made also a good many measured plans, but that these have not been hung, though there is plenty of room for them on the walls; the members who manage these things at the Royal Academy apparently not having yet arrived at the perception that plans are of any importance in the illustration of architecture.

We have naturally felt bound, as usual, to notice the architectural work first, as belonging more especially to our province, though it is not the most important portion of the designs exhibited, inasmuch as the Royal Academy has never taken the same place in architectural education that it takes in regard to sculpture and painting; nor does it, as we all know too well, provide anything like the same opportunities for its illustration. The sculpture is, as usual, among the best work done, but the Council have confused the students by their misleading title of the subject—"Prometheus Bound to the Rock in the Presence of Force and Strength." Prometheus was bound by Vulcan (Ἥφαιστος) under the orders of Force and Strength (Βία and Κράτος); no mention being made of Ἥφαιστος, the competitors have all taken it that he was bound by the *two* personages mentioned, instead of by one only. There is not, however, anything this year comparable in interest and originality to Mr. Leonard Jennings's "Three Generations" of the year before last. Mr. Clapperton's group, which receives the prize, composes well from all points of view, but in this as in all the others the conception of the figures of Force and Strength is rather weak, and there is no conception of Prometheus at all adequate; it seems, in regard to this prize, a year of good modelling with no indication of genius. For the "Model of a Design"—in other words, sculpture on statuette scale, the beautiful subject has been set of "Jacob Wrestling with the Angel," and the numerous models contain many good suggestions. Mr. Macdougald's design, which gains the prize, is fine in bringing out the distinction between the heavenly and the earthly wrestler; the angel with upraised wings and in an attitude of assured strength contrasting with the struggle of the mortal against him; this is a fine idea and would be worth working out on a life-size scale.

In the "Design in Monochrome for a Figure Picture," generally one of the least satisfactory classes of work, the first prize has not been awarded; a second prize is given to Miss Margaret Dovaston. The subject given was "The Death of Ananias," a subject with sufficient dramatic interest and scope for action to have been suggestive enough, one would have thought; but on this as on other occasions the sketches exhibited seem to indicate that the power of realising an incident in an effective and pictorial and yet natural manner is one of the last powers acquired by young painters; the designs are mostly either theatrical or commonplace. Miss Dovaston's composition is a very simple one, only two figures being prominent in it. No. 11 has more merit than the average. The want of grasp of composition is shown again in the Historical Painting competition; the most ambitious, the most difficult, and in general the least successful part of the students' work. There seems a difficulty in evolving any realisation of the story such as a spectator could accept as reasonable and probable; most of them are stage effects of a melodramatic order. As has happened in some previous years, the picture to which the prize has been awarded is the only one of the set which is at all acceptable as a rendering of the subject ("Ulysses Recognised by Euryclea"); it is somewhat heated in colour, but it is a well composed picture and shows the incident in a manner in accordance with possibility, if not probability.

The subject for a cartoon of a draped

figure was "Grief," and the prize has been given, rightly, to the figure by Miss Kate Olver which most powerfully realised the idea to be expressed. She has illustrated it by the figure of a woman thrown prostrate on the ground—a figure very well drawn and giving the expression of an abandonment to utter grief. The competition is a good one however, as far as line and composition in a draped figure are concerned; No. 125 and No. 130 are both very able drawings, in point of design, but not strongly expressive of grief; No. 128 is also a good one. For the "Design for the Decoration of a Public Room" the rather vague subject "Commerce" was given—a subject which might be treated with almost infinite variety; most of the competitors have chosen to treat it as pulling bales about, which is the view, no doubt, that is most directly expressible in painting, though Mr. C. A. C. Oliver Lodge gets an Honourable Mention for an allegorical treatment, better in design than colour. The prize design, by Mr. J. H. Amschewitz, is rather large in scale in the figures, but probably the shape and dimensions of the space to be filled were given, and as this is of rather high and square proportions, the employment of figures on rather large scale may have been thought necessary in order to fill the upper part of the space. Mr. Amschewitz's design is very pleasing and harmonious in colour; as far as the decorative element of design is concerned, we have seen better ones; but it must be admitted that the proportions of the space given are difficult to treat, as far as composition is concerned.

What is gratifying in the exhibition is that the two landscape competitions have produced better results than usual. In the paintings for the Creswick prize—subject, "Willows and Weeds by a Stream," there is less than usual of the crude greens that often trouble our eyes; much more feeling for landscape colour; and the painting by Mr. Ernest Townsend, which gains the prize, is a good picture both in general effect and in careful painting of foreground detail. The result of the Turner gold medal is still better. "The Ebb-tide" is the subject, and the picture by Miss Alice Walford, to which the medal is awarded, has really little trace of the beginner about it; it is a beautiful landscape, quite worthy to figure in the Academy's annual exhibition, where we shall hope to see it. Miss Walford gives a view over a flat country with a broad shallow river which, at ebb, has left a stretch of marshy country that would be covered at high tide; the foreground, a bank or dyke with long coarse grass, is very well painted, and the sky has a tender look of afternoon quiet. Several of the unsuccessful works are very meritorious, and there is far less than usual of those lurid and overwrought effects of light and colour which the name of Turner seems to have too often suggested to the competitors for this medal.

This year the studies of the Life Classes are exhibited in the water-colour room and in the black-and-white room, the latter containing the oil studies of the more advanced pupils. It is just a question whether studies of this kind are quite suitable to exhibit in a gallery to which the public have unrestricted access on these occasions; but it may be presumed that as a matter of fact no one does come to students' work exhibitions except those who are interested in art. These rooms show what an amount of really conscientious hard work is being done at the Academy in the study of the figure, more especially in the advanced studies in oils, some of which are of remarkable power both in regard to drawing and colour.

THE ROYAL SANITARY INSTITUTE.—At an examination in sanitary science as applied to buildings and public works, held in London on December 8 and 9, twenty-one candidates entered, and the following six candidates were awarded certificates:—C. A. Austin (Paddington), C. H. Comyn (Hyde Park); A. H. Dungay (Camberley); J. P. Larke (Lewisham); E. Middleton (Shepherd's Bush); J. Timson (Harrow-on-the-Hill).—At an examination in sanitary science as applied to buildings and public works, held in Manchester on December 1 and 2, four candidates entered, and the following two candidates were awarded certificates:—W. B. Clegg (Bradford); J. Turner (Matlock).

THE ARCHITECTURAL ASSOCIATION.

ON the 2nd inst. Mr. E. F. Reynolds read a paper before the Architectural Association on "Turkish Architecture," the first half of which appeared in our last issue. We now give the remainder and some notes of the discussion which took place.

The Mosque of Mohammed the Conqueror.

The original mosque of Mohammed the Conqueror, the first to be built in Constantinople, had been shaken by the earthquakes of 300 years, and, in 1768, its almost entire rebuilding became necessary. The new mosque has little relation to the original design, for it follows the fully-developed model of the Ahmed Mosque. The scale is still very great, but the forms are tainted with the Rococco corruption. Every dome and cupola of the former splendour is present, but the spirit is almost gone, while the tasteless body remains. Turkish art was fast declining in its course, and was now moving only by the force of its fall.

The development of Turkish mosque-building—originally founded on S. Sophia, gradually evolved in experimental adaptations, such as the Bayezid Mosque, and arriving at independent maturity and progressive accomplishment in the mosques Shah-Zadeh, Suleiman, Ahmed, and Yeni Valideh—has thus been briefly reviewed, but only in general terms, and barely touching on many essential questions. Perhaps the best way to crystallise the generalities in more definite form will be to select one of these mosques as typical of the others, giving a more detailed description, and illustrating it with more complete measured drawings. For this purpose I propose to choose the Mosque Yeni Valideh, which I have already mentioned as summing up very completely the normal and regular characteristics of the fully-developed style.

The detailed plan shows several points more clearly than was possible on the smaller scale. One of the first points which would strike a practical architect is the great flights of steps up to the various entrances. The floor-level of the mosque and forecourt is raised about 10 ft. above the surrounding ground, and this is by no means unusual. A fine approach and base is thus given to the building, but I have failed to establish any more practical reason for the custom. The Turks, however, repeat vague tales as to vast cisterns beneath the floor, and the well-known cisterns beneath S. Sophia give point to their probability.

The forecourt is set out in accordance with the traditional method, so that its outer walls form a continuation of those of the mosque. The walls are 6 ft. 1½ in. thick, practically the same thickness as those of the mosque itself; and their massiveness is somewhat surprising when their comparatively small height is considered. The court forms an exact square, but the wider intercolumniation of the central entrances makes some of the bays rectangular and their cupolas oval in shape. A curious effect of the independent spacing of the forecourt and the mosque is that the windows in the western wall of the mosque, common also to the forecourt, often occur out of centre with the bays of one or the other. As in this case, the effect from the forecourt seems usually to have been considered more important, and the windows have been set out in relation to its bays—with the result that they occur irregularly in the mosque. On the plan it is startling to see the main arches coming so recklessly over window openings.

Another instance of the same kind occurs in the main north and south porches. These fill the spaces between the minarets and the great buttresses, and their three bays are set out quite independently of the internal divisions. At the east end of the mosque are two smaller entrances, that at the north-east being reserved for the exclusive use of the Sultan. Other external galleries fill up the remaining spaces between the buttresses; their only use seems to be the shelter and sleeping-place of horrible beggars and yet more loathsome lepers.

The setting-out of the mosque itself is largely controlled by the relation of the semidomes to the domes; the aisles are approximately half the width of the central square, and the width of the external galleries is about half the width of the aisles. The repeated dimensions agree with almost absolute accuracy, the angles are set out with mathematical truth; and in all the plans which I have measured the same precision seems to have been observed.

The ritualistic fittings are few and simple. The Mecca-niche is placed in the centre of the eastern wall, and to the right is the pulpit for the Friday reading of the Korân. A *mastaba*, or platform, for those who chant the public prayers, is placed against one of the main piers, and low galleries run round the outer walls. These galleries are supported by light arcading, and are usually independent of the structure; but a broad gallery, extending across the west end, is here supported by the piers, and forms an integral part of the building. The galleries increase the accommodation of the mosque at special festivals, and are also used by the professors for teaching their classes, for the mosques are educational establishments on a very large scale.

The longitudinal section is taken on the main axis of the mosque and forecourt, and shows a complete section of the main dome with its arches and piers, the semidomes with their lesser semidomes and supporting arches, the western gallery and entrance, and a portion of the forecourt with its central fountain. It will be seen that the interior is of high proportions, and the scale may be appreciated by the size of the figure drawn in one of the doorways. The lower gallery is 50 ft. 7 in. from the floor, the gallery around the base of the dome is 91 ft. 3 in. from the floor, and the summit of the dome rises to about 132 ft. from the floor, or about 142 ft. from the ground. It should, of course, be remembered this mosque is one of the smallest of the greater mosques.

The walls, piers, and arches are constructed of limestone. Marble is used for the galleries, the *mastaba*, the pulpit, and the Mecca-niche, worked as masonry, and not as a veneer. The four main piers are covered with dark-blue diapered tiles up to the springing of the lower arches. The lower gallery marks the springing of the subsidiary apses and follows their curves on plan, and corbelling, built out beneath it, prepares for its reception on the square outline of the lower plan. The gallery itself is formed by the projection of a great corbelled cornice, and the pathway is protected by an iron railing.

The subsidiary semidomes are closed over by low-proportioned arches, and the pendentives between them bring the plan to a true semicircle. The semidome above is not a continuation of the pendentives, and there is a distinct break of surface at the junction. The lower part of the semidome is buttressed externally and pierced with a range of windows, and a slight cornice above them marks a second break of surface. Above this cornice the semidome springs afresh, and is completed without further interruption. These changes from the form of a true semidome are unnoticeable from the floor below; and they may be seen properly only on a close inspection, and especially by observing their intersection against the backs of the main arches. Their effect is to increase the spaciousness of the semidomes internally, and to give them additional importance externally, and they were doubtlessly introduced to counteract the foreshortening of perspective produced by the great height of the building. As may be expected, these refinements appear only in the later mosques.

The main dome is carried by four great arches, 7 ft. 7 in. wide, and its circular plan is produced by simple pendentives. A deep cornice of stalactite corbelling is set above the pendentives, and its projection forms a gallery around the base of the dome. Earlier domes usually spring with a slightly-stilted curve immediately above the pendentives, having a range of windows and buttresses at the base. Here, however, the dome is raised on a definite drum, and the windows and buttresses are applied to it instead of to the dome. The builders seem to have been aiming at a greater effect of space and height, and the treatment bears out the suggestion which I have made as to the semidomes. The wall of the drum is slightly inclined inwards, and pierced with twenty-four windows, and above them the inner surface of the dome is slightly projected on three courses of stalactite corbelling. The internal diameter of the dome is 53 ft. 6 in.

The drum of the dome is built of brick, plastered internally, and with its external buttresses covered with heavy sheets of cast-lead. The dome itself is also covered with lead externally, and internally its material is concealed beneath a coating of plaster or repeated whitewashing; but I have little doubt that it is also constructed of brick. The pendentives of the dome and its four great arches are built of stone. The semi-domes are covered externally and internally as the dome, and are probably built of brick, while their subsidiary apses and pendentives are of stone. Brick was obviously used for the sake of its lightness and adaptability, and it was invariably concealed from sight. In early mosques the buttresses and windows of the dome and semidomes are occasionally built of stone and remain uncovered.

I could have wished to throw some light on the construction of domes such as this, and also on its relation to the construction of Byzantine domes, but I regret that I can give but little definite information. In the earlier domes the springing of the curve is considerably below the top of the buttresses, so that some of its possible thrust is absorbed by them; and, moreover, certain additional flying buttresses point to this intention. But in this mosque the curve of the dome springs from the top of a drum and above the buttresses, so that the principle of abutting any thrust is put out of the question. The only alternative is to regard the dome as constructed in such a way as to have no thrust, and whether this is effected by means of a system of bonding-stones or chains, or by some adjustment of the jointing, I can offer no opinion. Constant familiarity with domical construction has given Oriental builders certain methods which, to our inexpert timidity, seem almost impossible, and these methods become the more mysterious and tantalising in that they are practically inaccessible to investigation.

The form of the dome is slightly pointed, but in some cases becomes practically spherical; the curves of the smaller cupolas are occasionally continued up to the apex by tangential straight lines, as is customary in the domes of Cairo. The four main arches of the dome are pointed and stilted, and the arches of the subsidiary apses are depressed, and probably struck from four centres. The half-section looking toward Mecca shows the external galleries, which fill up the projection of the great buttresses, the internal gallery, and half of the Mecca-niche. The half-elevation toward the east shows the main walls rising to a constant cornice level, the drums of the cupolas and subsidiary semi-domes emerging from the flat roof, the ranges of windows and buttresses to the semidomes, and finally the dome itself. Four octagonal turrets are built over the piers of the dome, and their weight materially assists in securing the main arches. The great buttresses are stepped up to the turrets, and an octagonal cupola is set on each step.

The sides of the mosques are the most conspicuous at close quarters, for the west end is screened by the forecourt, and at the east end is usually a garden. The lower parts of the sides are occupied by the porticoes and external galleries, and a great overhanging roof shelters the fountains of ablution below. Above this pent-roof the walls are arched in correspondence with the internal divisions, and crowned with a cornice which completes the square base of the whole building. Above this cornice the various domical forms fall within an approximately pyramidal outline, the minarets freeing themselves of all attachment, and soaring upwards high above the dome.

One of the most striking features of these mosques is the great number of their windows. All of them are small and of about the same size, and, on the inner and outer faces of the wall, they are filled with plates of plaster tracery, in which small rounds of glass are embedded. This principle of minutely subdividing the lighting areas is characteristic of the East, and is due to the need of tempering the dazzling sunlight; and the preference for a large number of small windows, scattered more or less equally throughout the building, completes the same idea on a larger scale. The same traditional tendency is shown in the forecourt, where each bay has two openings, although only one story in height. The lower windows of the mosque and forecourt are square-headed, and have a shallow architrave around them, and the upper windows have arched heads, the arches being formed with two segments at the springing and continued with straight lines to the apex.

The masonry is built of white limestone in fairly large blocks, the courses are more or less continuous and vary considerably in depth, and the joints are fine. Marble is introduced in the porticoes and galleries, the shafts being dark red, or veined with violet, and the balustrades are of some white variety. Discs of green and red marbles are inserted here and there in the masonry, and the voussoirs of the arches are alternately pink and white. The entrance doors are usually built of marble masonry, and the alternation of colour in the arches is often carried down the jambs.

The roofs, including the domes, are everywhere covered with lead, and some such material was necessary to protect them from the violent thunderstorms which gather in the Black Sea and sweep suddenly over the city. The lead is cast in heavy sheets and applied with rolls, and the water drips from the edges without gutters.

A curious point may be noticed with regard to the great buttresses. As has already been said, these had always existed within the building, but in the Suleiman Mosque, with its increased scale and height, they appeared for the first time above the roofs. In the Suleiman Mosque only two of the main arches are open to semidomes, the other two being filled with tympanum walls, and accordingly the buttresses were built on the north and south only; and in the Ahmed Mosque, with its four semidomes, they extend on all four sides. Here, however, in the Yeni Valideh Mosque, they extend on the north, south, and west sides, but not on the east side. This variation is curious, for if the buttresses were necessary on any of the sides they are equally necessary on all. It can hardly be supposed that such great erections were built merely for effect, and it becomes an interesting question as to how they could have been dispensed with on the east side of this dome. The only reason for their omission which I can offer is that the buttresses block up certain windows in the semidomes, and that a complete range of windows was desired in the eastern semidome above the Mecca-niche; but, at the same time, this desire for the removal of the buttresses does not provide the means of doing so.

I should here like to make a statement as to the degree of accuracy represented by these measured drawings, for reproductions of them may possibly be used as documents of reference. The small-scale plans may be taken as perfectly correct so far as they go; that is to say, in all the main dimensions, the thicknesses of walls and the spacing of windows. In some cases I will not vouch for the accuracy of such details as the projection of steps, etc., and the non-structural fittings of the interior have been omitted. The small-scale sections are mere diagrams. The more detailed drawings of the Yeni Valideh Mosque may be taken as correct in all essentials, and also in such decorative detail as could be shown on a scale of 12 ft. to an inch. The building is remarkably accessible to measurement, for winding staircases in the great buttresses lead up to the flat roofs, the domes, and the internal galleries; and nothing could give a more vivid realisation of the scale and method of building than to climb among the buttresses and cupolas as though they were the peaks and crevasses of a mountain. The dome was measured up to the cornice of the drum, but above that level its height has been judged by observation and from distant photographs. Another test, however, was applicable from the coincidence that the second balcony of the minaret is practically on the same level as the summit of the dome, and the height of both may be taken as probably correct within a foot.

The minarets give more character to the mosques and to the whole City of Constantinople than any other single feature. The value of their slender height, in contrast with the domed mass of the mosque, has already been mentioned, and without its minarets Constantinople would be hardly recognisable. No mosque was ritually complete without a minaret, but the desire for increased magnificence soon multiplied their number. Their primary use was to elevate the "mueddin," who summoned the faithful to prayer, so that his voice might be heard above the surrounding roofs, but the minarets grew quickly beyond this first necessity, and if the "mueddin" were to chant his call from the upper balconies of later minarets, his voice would be almost lost in the clouds. The minarets are also used for illumination, and on the nights of the great religious festivals their balconies glitter with thousands of lamps all over the city. The minarets consist of an enclosed winding staircase, which emerges at various levels on to balconies projected on stalactite corbelling. The construction is strong, and they rise to prodigious heights, but I have no dimensions of the largest instances. The minarets of the Yeni Valideh Mosque rise to about 240 ft. above the ground, but several in Constantinople must be considerably over 300 ft. in height. The roofs are steeply conical, framed with wood and covered with lead, and terminated with a finial bearing the crescent. The smaller minarets have two balconies, and none have more than three. The design of all the minarets is practically identical, the shafts being polygonal and slightly reduced in diameter above each balcony. It has been said that Turkish minarets are the ugliest form of a singularly beautiful feature; but I think they may claim to have that relative fitness which is the greater part of beauty. Although in themselves they may lack the rich outline of Cairene minarets, yet Cairene mosques have not that complexity of cupola and dome to which the severer elegance of the Turkish minaret acts as a necessary foil.

So far, little has been said as to the internal decoration and effect of these mosques. Many of them have lost much of their original splendour, and are now largely decorated with nothing more elaborate than whitewash. But even this harmless treatment is better than the horrible mixture of corrupt Saracenic and Rococco painting with which the modern Turk has desecrated some of the mosques. Painted decoration of a different character, however, was always an important and legitimate method of lending interest of colour to architectural form, and where a more permanent means of decoration was unavailable a system of painted pattern completed the intention of the original builders. Such decoration has usually been obliterated by subsequent whitewash, or only partially remains; but one great mosque—the Ahmed—has entirely retained its original painting, although restored to some extent. The upper parts of the walls are covered with diaper patterns of conventional foliage and flowers, and the arches and domes are bordered with running designs, and set with foliated discs at the crowns. The pattern is applied on a white ground, and the colours are chiefly blues and greens, brightened here and there with red; and the effect would doubtless be very beautiful if the brightness of the innumerable windows was still tempered by their original tracery. But modern glazing has here done its worst, and in the excessive light the gaiety of colour appears tawdry and even vulgar. In the Yeni Valideh Mosque traces of a very complete decoration may be detected under the whitewash of the semidomes, the designs being large in scale and constructed with interlaced arabesques. Little actual colour remains, however, save the alternate green-painted arch-stones and great circles of Arabic inscription in the pendentives and at the crown of the dome.

But if the perishable quality of paint has deprived the upper walls and domes of their decoration, the lower parts often still retain their more enduring tilework, and the glazed surfaces give a brilliance and lucency of colour which no paint could achieve. The earlier tiles are of a rich azure blue laid on a white ground, or conversely treated, and geometrical shapes or foliage with pomegranate flowers are the principal decorative motives. The fertility of design is amazing, and the combination of different effects most ingenious, while the prevailing blue and white gleams here and there with most effective touches of emerald green and red. A wider range of colour and pattern was used in later tiles, but with the widening of resource came a tendency to over-elaboration and ineffective cleverness. The tiles are fairly large, and the pattern seems to have been painted on large slabs,

afterwards cut up for the process of firing, for the joints often have no relation to the design. The tiles were imported, and their designs were obviously inspired by Persian influence. Such tiles were used for the partial decoration of the greater mosques, and especially for the enrichment of the Mecca-niche, but the interiors of the smaller mosques and the *türbehs* or tombs were sometimes thus decorated completely. The mosque of Rustem Pacha is one of the finest earlier instances of this treatment, and the *türbeh* of the Shah-Zadeh Mosque is a good example of the later work.

The essentially Oriental method of decoration is the application of colour and pattern to the flat constructive surfaces, and is opposed in principle to the Western method of light and shade by relief. S. Sophia is a pre-eminent instance of this Oriental method, and its marble plating and mosaic were represented in the Turkish mosques by tilework and painted decoration. Hence, carving was comparatively unimportant, and it was chiefly used for the enrichment of the ritual fittings, and was rarely applied to the main structure except in the form of stalactite work. This, however, is a large reservation, for such work was almost invariably employed to effect modifications of form. Thus, in the capitals, the change from circular or octagonal shaft to square springing is managed by some arrangement of stalactites, the corbelling of the subsidiary semidomes and minaret balconies is worked in courses of stalactite work, and the recesses of the niches and portals are covered over by deep heads of stalactite vaulting. Cornices, too, are frequently carved with a shallow version of the same work. Stalactite work may be defined as a horizontal and vertical series of arches, those of each course springing from the apices of those below, so that the general surface advances by degrees; but the original scale of the arches was gradually reduced until they became a mere sculptured mimicry, no longer arcuated, but corbelled in construction. This freedom from structural limitation allowed a complication of plan form and grouping which defies description, and sometimes almost defies analysis, and the later stalactite work may be regarded as the *tour-de-force* of that mathematical ingenuity which has always distinguished the Oriental mind. I can make no attempt here to inquire into the characteristics and development of stalactite vaulting, for so intricate a subject would need a whole paper to itself.

A somewhat rare application of carving occurs on a small *türbeh* in the garden of the Mosque Shah-Zadeh. On each side of the entrance are two marble slabs, carved with a flowing geometrical pattern interwoven with foliage and flowers. The relief is low, and the chiselling most delicate, but, apart from its beauty, the treatment is interesting as being a carved version of the decorative motives characteristic of tilework.

The greatest richness of carving was lavished on the pulpits. The spandrils of the steep flight of steps were wrought with intricate geometrical devices, and the balustrades were pierced with similar patterns, while the platform at the top was covered with a canopy set on a fourfold arcade.

Another feature especially selected for enrichment of carving was the fountain in the forecourt, mainly, no doubt, because of its ritual significance, but with most happy architectural effect. The earlier fountains were often shaded by a pent-roof supported on shafts; but the single fountain was soon found inadequate, and later mosques have long ranges of washing-places under the external galleries, the fountains in the forecourt being retained as cisterns. These later fountains are usually octagonal, with engaged shafts at the angles carrying arches, and with the interspaces filled with bronze or marble grilles. The cistern is enclosed within this octagonal arcade, an outlet for the water being pierced through each side, and the whole is crowned with a crested stalactite cornice and covered with a cupola. The whole forecourt, with the central richness of the fountain, with the marble arcades and repeated cupolas of the surrounding cloister, with the foliage of cypresses and vines, form delightful places of cool shade and interwoven sunshine; and toward the east the towering walls of the mosque pile up to the countless domes.

All the carved work, except the corbelling to the semidomes and minarets, was executed in marble, of a white or slightly-veined variety as a rule, but sometimes of a soft red marble for the capitals. The material encouraged great refinement of finish, both in scale and technique, a refinement which well accorded with the general precision of workmanship. It has already been said that the Turks employed a very fully-developed system of decorative detail at Brûsa, and in the mosques of Constantinople the same system was used with hardly any further development, and often with greater reserve. The general tendency of carved decoration was toward a somewhat dry and mechanical manner, and much of the most beautiful work is to be found in the earlier mosques. Unlike Byzantine building, Byzantine decoration seems to have exercised no direct influence on Turkish art, and its decoration remained purely Saracenic until the final corruption with Rococco trivialities.

Thus the principal means of the internal decoration of the mosques were marble, tilework, and painted decoration, and remaining instances give a hint of their combined splendour of colour and pattern. The more purely architectonic qualities of the interiors were, in some degree, subordinate to the mode of decoration, and are more difficult to appraise. The arches are unmoulded and the surfaces of the walls and domes are flat and unbroken, and if often they now look destitute and empty it is only by the loss of their essential decoration of colour. The dome, semidomes, and cupolas fill the interior with the interest of their curving modulations, but their combined complexity, borne entirely by the four great piers, is a typical instance of that Oriental ingenuity which, to the Western mind, sometimes seems fantastic and lacking in reasonable sobriety. Moreover, the mosques are challenged by the simpler and more familiar grandeur of their prototype, S. Sophia, and a supreme standard is thus created which no such series of buildings could endure. It would, perhaps, be wiser to withhold presumptuous judgment of an art born of a race and climate so different to our own, recognising that the prejudice of another ideal may prevent us from entirely sympathising with it, meanwhile enjoying those obvious qualities which we are able to appreciate.

Externally, the broad masonry of the walls has a certain masculine vigour and largeness of handling which contrasts with the softer grace and minute elaboration of other Saracenic schools, and the influence of a more northernly climate may be traced in the lack of applied colour and in the tendency toward effects of light and shade. But above the walls, which still retain something of the Oriental simplicity and reserve of surface, the cupolas and domes break into an almost bewildering complexity of form. The mosques of Cairo and elsewhere admit the picturesqueness of dome and minaret above the simple rectangle of the lower walls, but their freedom can hardly be compared with the exuberance of the Turkish mosque. Only one restraint was observed—the controlling outline of the whole group, but within that single limit Turkish architects seem to have vied with each other in erecting the most amazing phantasy of cupola and dome. I think that this emulation was conscious and deliberate, for, although each several part has its service of use, yet their combined æsthetic quality was intensified by the innumerable finials of the cupolas and by the development of the buttresses with miniature turrets. It may be said that in these astonishing congregations of domes may be seen the reflection of the grotesque humour of the north; but the Turks were no northern race, and the quality is hardly of grotesqueness. There may surely be no doubt that the same fantastic spirit of the East which produced the wonder of the stalactite vault wrought also these roofs of bubbling domes.

I feel that I have given but the roughest sketch of the full picture, although I have taxed your patience with a paper of inordinate length; but if I were to conclude here I should but barely have mentioned the most effective cause of the beauty of the mosques—I mean their setting in the landscape of the city. They usually crown some eminence above the Golden Horn, and the mosque itself is but the centre of a larger group. A garden is inclosed by screen-walls to the east, and the tombs of prince and sultan raise their marble walls and domes amid the trees. Around the central group of forecourt, mosque, and garden is a vast enclosure, shaded with ancient trees and girdled by a wall, and entered by tall gate-houses and stately portals; while around the encircling wall again are set the libraries, the schools, and the houses of charity. Thus, from a distance, the mosque is seen rising from the red roofs of the city below, a harmony of assembled cupolas, its white walls and silver domes gleaming in the sun, the foliage of cypresses dark against its brightness; while, soaring above all, the slender minarets pierce the blue sky.

The lecture, which was illustrated by some excellent lantern views, was, owing to the partial failure of the lantern, not concluded until the usual time for adjourning the meetings of the Association.

The Chairman said they would all agree that they had had a unique and most interesting paper, and, although the hour was late, he would call upon Mr. Spiers to say a few words.

Mr. R. Phenè Spiers, in proposing a hearty vote of thanks to the lecturer, said it was nearly forty years since he visited Constantinople, and then he was there only three weeks; and, therefore, he had a vague notion only of the buildings he saw. Mr. Reynolds seemed to have been more fortunate than he (the speaker) was. He (Mr. Spiers) was prevented from doing much sketching in the streets on account of the small boys throwing stones; but he was, by a piece of luck, fortunate in getting permission to draw inside the church of S. Sophia. His companion, M. Brune, an old Grand Prix man, had strong letters of introduction to the French Ambassador, who tried to get permission from the Grand Vizier for them to sketch in S. Sophia, but he was told that it was impossible, and so the endeavour was given up. About a fortnight later, however, the Grand Vizier wrote to M. Brune to say that the Sultan's photographer had been commissioned to take a series of photographs for the great exhibition of Paris to be held in 1867, and the Grand Vizier said:—"Go and see if he can arrange to take you in." The photographer readily consented, and they went into S. Sophia as his assistants, though they set to work to make drawings while the other man photographed. For three days they were there, and the dragomen sent to protect them maintained their right to remain in the mosque. That was good luck, for Mr. Henderson had been six months in getting permission. He desired to congratulate Mr. Reynolds, and to congratulate the members of the Association, on the fact of which Mr. Reynolds complained at the beginning—*i.e.*, that he could not find any information on the subject. That, of course, had led him to make personal observations, and nothing could be better than his remarks on the mosques and his descriptions of their variety of design not known before. It was specially interesting in that there was no account anything like what Mr. Reynolds had given them, and therefore they were most fortunate. The magnificence of S. Sophia was such that it dwarfed the other mosques in Constantinople, though by themselves they were very fine. He saw, while in Cairo, the mosque of Mohammed Ali, which was built about 1830, in imitation of one of the mosques at Constantinople, but badly built, and already falling to pieces. It had the usual great scheme of central and subsidiary domes, but what made it remarkable was the beauty of the *ensemble*. It was the general form of these buildings and their situation which gave them grandeur, both internally and externally, which the architectural detail did not afford. Mr. Reynolds' paper was full of thought and research, and he deserved their congratulations. It was well known to the members that the reader of the paper won his travelling studentship by a design for a Byzantine church, and he showed in that design that he had a complete knowledge of the principles which formed Byzantine architecture, and he showed that he had the power of realising them in his design. It was fortunate, therefore, he went to Constantinople and selected the subject of mosques, about which so little was known.

Mr. A. E. Henderson said he had great

pleasure in seconding the vote of thanks to Mr. Reynolds for his interesting and accurate description of the great mosques in Constantinople. He could amplify the difficulties Mr. Reynolds encountered in measuring and sketching, but he would confine his remarks to the paper. He agreed with Mr. Reynolds in his dislike to the four great circular piers in the mosque of Sultan Achmet. The bracketing out to support the imposts to carry the arches looked weak in the extreme; besides, they made the scale of all the other architectural parts too small. This mosque had four minarets, one at each corner, and at the western angles of the cloistered court, and as at that date there were six minarets at Mecca, Sultan Achmet was compelled to add a seventh, otherwise his mosque would have been of greater importance than the holy mosque at Mecca. Mr. Reynolds seemed to think that the voices of the criers could not be heard from the lofty balconies of the minarets, but he (the speaker) had often listened to the four muezzins, calling from S. Sophia, and could hear them distinctly, even though a slight wind was blowing. S. Sophia keeps a staff of twenty, each man to call only once in the day. They are trained from youth for this purpose, and their voices in time penetrate far further than we Westerners have any idea of. As Mr. Reynolds said, there were only three ritualistic fittings in a Turkish mosque. The mihrab or niche, the mimbah or Friday pulpit, and mastaba or raised tribune for the choir. The niche is a small recess in the centre of the Eastern wall, sufficient to take a prayer rug for the officiating priest. This gives the direction to Mecca—of course, in India, the mosques point westward, as all devout Moslems must pray towards the holy city. The Friday (or the Moslem Sunday) mid-day pulpit is a narrow flight of steps leading up to a small canopied platform. Ornament was as much lavished upon this fitting as upon the niche. If the mosque was an ancient church the officiating priest ascends and descends with sword in hand, showing that the building is theirs by conquest. All large mosques and Dervish tekkehs have large colleges attached to them. The classes are held in the mosque from sunrise to about 9 or 9.30, when the day's teaching is over. The students reside in little rooms around picturesque cloistered courts. The tendency of the later mosque builders was for an increase in height rather than floor space, and the Yeni Valideh Mosque was the finest example of this type. It was built close to the edge of the Golden Horn, with warehouses round three sides of it, and now, unfortunately, shops had been built in front of it; but its cornice is still seen over the ugly modern buildings. Mr. Reynolds mentioned the smallness and number of windows used. If this were not so, a mosque interior would be unbearable on account of the sun's rays pouring in. So, to obviate this, small openings were placed in thick walls, which permitted the beams to come through for only an hour or two at most, and this with a quickly moving path; then the outer glazing covered with cobwebs toned the strength down, and if the mosque had withstood the numerous earthquakes, it had a mosaic of jewelled glass for an inner window. He could not understand why our modern church architects did not adopt the double window for our churches; they kept the temperature within much more even; in summer it was cooler, and in winter warmer and less draughty, as the cold outer glass only chilled the air space between it and the inner glazing. Mr. Reynolds did not draw attention to the quantity of iron tie-beams used. There was hardly an arch turned in Stamboul without a single or double iron tie-beam. Iron rods and ties were built both horizontally and perpendicularly in all modern buildings, and there was every reason to expect that if the domes of these mosques were examined armulets of iron would be found encircling them, and in this way would only transmit dead weight to the walls and piers below. It would have been most interesting to have seen the development of Byzantine surface decoration in Turkish hands, but this could not be, as the Moslem was forbidden by his religion to portray the similitude of life, and, of course, the very *motif* of Byzantine decoration was the Virgin and Christ, and scenes from their lives. Coming from Europe this was most striking, and the beautiful intertwining foliage and flowers took a long time to be a substitute for this. It was said that Sultan Suleiman sent for Persian tile manufacturers, their clay and glaze, and made a colony just outside the walls, where they set up their kilns and made the tiles. This was why the tiles fitted the architecture so admirably. While Sulieman was away from the city Rustem and Mehmet Pasha stole the workmen, and they made tiles for their mosques instead of for their master; this was how the Sulie-manch mosque had so few tiles upon its walls. There was a very great want in a Turkish mosque. Maybe we expected too much, as we compared it with a Christian church; but we should remember how simple the worship of the Turk was, how precisely he went through his devotions—in fact, as a regimental drill. He had no complicated ritual; he only needed an expansive floor space, and so we looked in vain for choir or chancel, storied canopies, and elaborate tombs, shrines, and statues. No; we see naught else but architecture and surface decoration, and this was only a frame at best for other things. A mosque could only be understood by seeing the concourse of devotees, closely packed together, going through their worship to Allah.

Mr. J. B. Fulton said that they had had a most interesting paper. He did not think that anyone else, not only in Great Britain but in the whole world, could have given them what they had had that evening, and their thanks, if he might say so, were really due to the Sultan for his permission for Mr. Reynolds to make his observations. The paper had revealed to them what was really a new style of architecture to us in England. It was a style we ought to know something about, for it carried on the Byzantine style of building, which was undoubtedly the finest that the world had yet produced. We had seen it, of course, adapted to modern requirements by, perhaps, the greatest master we have had, and that was Wren; yet Wren never achieved what these Turks had done—*i.e.*, getting the wonderful constructive domes over huge floor spaces, giving the effect of being in the outer atmosphere. That was one of the principal points in Turkish architecture, *i.e.*, the building up of these great spaces in such a wonderful way, which Mr. Reynolds had so well described. Of course, if the architecture was right, it was not only right as a building, but it was happy in its parts—and, as Mr. Reynolds had said, "the relative fitness was a greater part of beauty"—the fitness of the building for the purpose it was intended. There was no more picturesque place in the world than Constantinople; it was marvellously picturesque, as they would see from the photographs. As to the decoration of the buildings, it was a revelation to him. The delineation of the human figure was the highest development of art, and Michael Angelo never even descended to anything lower—only in one case did he do so, *i.e.*, in the case of a tree. But the next thing was to study nature, and a flower was a beautiful form of nature. He had studied flowers and conventional flowers here, but he had been struck by the marvellous way in which the Turks saw nature and conventionalised it. He did not say that they had attained the height of beauty; that was left to some future ages; but he thought that, just as from their architecture we had many points to learn, so had we from their decoration. As Mr. Henderson had said, the Turks were prevented from using the human figure in art in the mosque because of their religious scruples, and so they took floral decoration and carried this to a very high point of excellence indeed.

The Chairman, in putting the vote of thanks to the meeting, again referred to the great value of the paper, and expressed regret that the lantern had behaved in such an eccentric manner.

The vote of thanks was very heartily agreed to.

Mr. Reynolds briefly replied, and thanked Mr. Fulton for the loan of drawings, and Mr. Fyfe for the loan of some photographs.

The Chairman announced that the next meeting will be held on the 15th inst., when Mr. W. H. Bidlake will read a paper on "Church Towers and Spires," illustrated with lantern views.

The meeting then terminated.

INTENTION IN ORNAMENT.*

THE complexity of ideas and thought which underlie the expression of the modern artist is not to be denied. In whatever form the result may appear, and in every medium employed, there will be found the same departure from the abstract principles of beauty which were sufficient to satisfy the more simple attitude of the masters of a former time. The various revolutions in style which have taken place in recent years, and the enthusiasm expended, is sufficient evidence of the desire for a more direct utterance than the academic use of forms and features of the preceding and rejected fashions will allow. In every revival, however, the mistake of re-embodying the matter rather than the spirit has been made; the result has often been characterised as meaningless, chiefly on account of the fact that the more readable portions of the design have nothing in relation to the contemporary life; that is, contained no reflection of the forms then in use as exemplified in clothing, manufacture, and other utilitarian and artistic expressions.

It is becoming more and more infrequent to witness the obsession of a past style carrying away an artist from his more direct expression. A certain number of the most able designers have endeavoured to revert to principles in which forms and ornament of purely abstract character have predominated; the result has been more than a lack of warmth and interest; it has resulted even in a certain priggishness and complacency in the quality of design which has passed the bounds of austerity. This negative attitude of mind has insisted on the beauty and unashamedness of what I may call the nude, and we are left without a vestige of moulding, ornament, or trimming whatever, and we are asked to be witness to the emotional quality of the bare surface and the lack of orderliness and articulation which such efforts display. We have thus the two extremes—the academic use of old forms and features applied arbitrarily under conditions which are entirely opposed to those which assisted to evolve them; and, secondly, the attempt to ignore tradition altogether and be entirely original, with the results I have suggested. With such forces in opposition, and with the admitted sincerity of both, a certain compromise has inevitably resulted, just as we find in modern musical composition; "characteristic illustration of things which are interesting and attractive on other grounds than mere beauty of design or of texture," combined with the survival of forms which are not to be denied since they have been proved by a gradual evolution to be satisfactory, graceful, and harmonious by virtue of their logical basis and origin.

Again, the very varied and particular uses for which the modern building is now designed may even result in something analogous to the element of realism which has been so prevalent in the other arts. The quality of suitability for the purpose for which they are designed leads to the classification of edifices which in past times were almost entirely either ecclesiastical or residential. At a glance it is revealed to which of the two categories the majority of old buildings belong; but with many modern examples, with their infinite variety of purpose, it is hardly so clear. They might say, as the American poet, Whitman, "Do you see no further than this façade, this smooth and tolerant manner of me? I am not what you suppose; I am even more interesting than you suppose," or something to the same effect, with every justification. In the case of the modern building of the residential class, from the cottage to the town house, this veil of abstraction is legitimate enough. It would be ostentation of the most objectionable kind to insist on the individuality of the ordinary citizen, and the country or suburban palace is a retreat, in the design of which the personality of the owner is better unexpressed, save in the case of a royal or princely abode; but, in the many varieties of public and semi-public buildings which are now erected there is surely no need for such uniformity or negative qualities, and the purpose of these buildings might be expressed in many ways, both allegorically

* Part of a paper read by Mr. E. A. Rickards before the Liverpool Architectural Society, December 4.

and literally, to stir the imagination and swell the pride of those who have common property in them. Though this result may be to some extent achieved by the more grandiose treatment of their larger and architectural masses, it is hardly to be expected that any literal expression can result from such features, which are purely abstract in their general form, whether they happen to belong to an opera house, court of justice, or a library, on a grand scale. One can imagine the same severity of architectural treatment underlying the design in each of these instances.

When it comes to the subordinate details, however, of either of such examples as these, there is at once an infinite possibility in the variety of design and treatment, much in the same way as the costume of a human being may express character, worldly position, and so forth. The evolution of the arrangement of our public buildings has brought about many distinct types of plan, so markedly different and so peculiar in each variety that it has become exceedingly difficult to break new ground when preparing a scheme for any additional work of a particular character. As far as interior design is concerned it must be admitted that a certain character in architectural treatment has often resulted from the very conditions imposed. The grouping of seats in a court-house, or the arrangement of orchestra and platform in a public hall, or the generally-accepted plan of a swimming bath, for instance, forms a basis from which may be evolved a class of design analogous in its principles to the classical examples of temples and amphitheatres or any building erected for a specific purpose. But I am more concerned with the plastic treatment of an exterior, where so much freedom of expression is possible, and where, with the aid of sculpture, deliberate and arbitrary methods might apply. I say deliberate as opposed to the Byzantine idea of letting the outward shape simply follow the lines of the interior, when sometimes ugliness is excused on the ground of truth. Let us have a due measure of expression of the interior by all means, but, following the example of Wren and other masters, let us clothe it with as much beauty as we can, and, in addition, let the purpose, as far as possible, be expressed in ornament wherever it happens to be used, for, after all, it is in the ornament that the story of a building can only be literally stated.

It has been pretty well proved that the present style of Renaissance which is universally adopted for public work is capable of the freest treatment, and especially lends itself to applied ornament. The many examples in Paris, from the Opera House to the quite recent buildings, are excellent proof of this. There is hardly any limit to the lengths to which the more accessory design of sculpture and ornament may not be taken, and yet be made to blend with the general design. We have passed beyond the academic copying of the classic examples, and old work no doubt in future is to be studied, not to be memorised and reproduced in whole or in parts, but with a view to extracting the logic underlying the design generally, and the intelligent application and form of accessory features which serve to bind together and render harmonious the various masses of the general composition. The same should certainly apply to a study of ornament, for we are hardly in the position of the Italians who so often set out to reproduce the Roman and Greek work in every detail, and were only saved from a direct copying by the strong individuality they hardly knew themselves to possess. It is impossible for the modern architect to approach a design in this simple spirit, any more than the informed artist, scientist, or whoever he may be, can work in a language he knows to be dead, or treat of a subject or theory which he is intelligent enough to understand has been absolutely disproved. Therefore, having gained technique and facility from an intelligent study of the past, he has all the wealth of suggestion which is to be derived from modern life and forms at his disposal to embody in the decoration of his design; just as in literature we have added to our vocabulary and expressions as the complexity of ideas has increased.

We have witnessed in London recently the erection of such important public works as the new War Office, the new Sessions House, the Admiralty, and so forth. Yet, can it be said that any of these buildings bear any significance of the character of its purpose, or is there anything beyond a few allegorical figures suddenly introduced amongst the cold atmosphere of architectural forms, to attest the nature of the business for which it was constructed? Even these might easily apply to one building or to another for all the literal suggestion which they convey. Any national monument of such importance should surely be treated as a manifestation of the qualities and attributes of the institution for which it stands, and architecture and sculpture might well combine to glorify its dignity and power with all the means at their disposal. What a combination of allegory and realism might any of the above-mentioned subjects suggest; what reflection of incident and material could be effected, and how magnificently the forces within might be represented literally and symbolically; yet the abstract quality in the way such buildings are treated in these unimaginative and self-conscious times brings them all into line, and their monotony of conception and detail leaves them under the same heading of good form which has become our chief social characteristic.

TESTS OF OPEN DOMESTIC FIRE-GRATES.

At the request of H.M. Office of Works, the Coal Smoke Abatement Society conducted last week a series of tests of twenty-four open domestic firegrates which have been entered for competition by various manufacturers. The grates were fixed in twenty-four rooms on the second floor of the new Government buildings now being built at Westminster. The rooms extend around the four sides of one of the courtyards, and are of approximately equal area—about 300 sq. ft.—and each room has one window and one temporary door. In all cases the fireplace is near the middle of one of the side walls at right angles to the window-wall, and all the flues are carried up to the same height, probably 50 ft. or 60 ft. above the grates. Among the conditions to be observed by competitors, there are only two which are of general interest, namely, that the grates must be of the open type, and must not measure more than 20 in. in width across the front.

Four "points to be ascertained by these trials" were mentioned in the instructions to competitors:—

(1) Prevention of smoke.
(2) Heating power.
(3) Economy of fuel.
(4) Suitability for office and household purposes.

The method of testing has been carefully considered by Sir Henry Tanner and the representatives appointed by the Coal Smoke Abatement Society. The fires are lit at 8 a.m., the quantities of wood and coal being weighed. Weighed quantities of coal are added when necessary during the day, and at the end of each day's test the fire is drawn and the unburnt cinders weighed, so that the weight can be deducted from that of the coal put on the fire during the day. Poking of the fire is not allowed, and competitors are not permitted to be present during the tests. The temperature of each room is recorded every half-hour, two thermometers being provided for the purpose, one being placed on a stand 6 ft. from the fire and level with it, and the other on one of the walls. On Wednesday the second of these was hung near the door of the room, and the first was placed at an angle of 45 deg. with the fire. We understand that on Tuesday the two thermometers were directly in front of the fire, the more distant one being hung on the opposite wall. The temperature of the corridor is recorded at the same time. In each room a ruled sheet of paper is hung up, on which the attendants record the temperatures, the amount of coal, etc., and the time at which the temperatures are taken and the fires replenished. Hygrometric tests are also made two or three times a day.

The smoke tests are made on the roof of the building. A length of flue-lining is fixed on the top of each flue, and each of these has a distinctive letter painted on it. The rooms below are numbered irregularly, and the smoke-observers on the roof do not know to which room a particular flue belongs. Although it is, perhaps, too much to say that "no collusion is possible" between them and the attendants below, it may be granted that the utmost appears to have been done to prevent such collusion. Four observers are in constant attendance on the roof, each having charge of six flues. Each observer has a sheet, with squares, varying in tone from light to dark-grey, and has also six charts (one for each flue) ruled into squares, the vertical lines representing five-minutes' intervals and the horizontal lines representing the four or five hues shown on the smoke-diagram. An observation is made of the smoke from each flue every five minutes, and is recorded on the chart of that particular flue. Two observers are in charge of each station, and work in "shifts" throughout the day. It was originally intended to continue the tests for three days only, but, in order to eliminate as far as possible the personal equation, it has been decided to extend the test to four days, so that each observer will have charge of the four groups of flues, one group on each day.

The firegrates entered in the competition vary considerably, but we did not notice anything particularly novel. In width they range from 20 in. down to about 12 in. There are a number of the well-known type recommended by Dr. Teale; others are of the more modern kind without front bars; others, again, have a subsidiary-controlled flue extending from the body of the grate and passing up behind the firelump back to the main flue; about half-a-dozen have hot-air chambers of various kinds; there is one independent, open-fronted stove, standing quite clear of the chimney breast; one which may be called a half-stove; and one with two pairs of sliding-doors so that the combustion can be regulated at will.

It is obvious that grates of such different sizes and types will give different results. The highest corridor temperature on Wednesday was 46 deg. F., and the highest temperatures recorded in the rooms between 8 a.m. and 3 p.m. ranged from 52 deg. to 62 deg. F. near the door, and from 70 deg. to 90 deg. at a distance of 6 ft. from the fire, while the coal consumption for the seven hours ranged from 24 lb. to 44 lb. The smoke tests also showed considerable variation. These figures indicate that it will not be an easy matter to decide as to the respective merits of the different grates. We may add that the rather low room temperatures recorded appear to be due in part to the new and unfinished state of the building, the floors and ceilings being of rough concrete and the walls of unplastered brick.

While there can be no doubt that the tests are being carefully and fairly made, under conditions as equal in all cases as practicable, there must inevitably be some differences due to the varying positions of the rooms and to the courses of the flues and the positions of the chimneys. In one room, for example, there was distinct evidence of smoke. But it is better that the tests should be made simultaneously in different rooms, rather than on different days in the same room. There is one other point which may be mentioned, and that is with regard to the thermometers. We were not informed by the representatives of the Society whether these had been tested or not. As it is not uncommon for two thermometers placed side by side to give readings differing by one or two degrees, the thermometers used in the tests ought to be tested before the Society's report is issued. Probably this has already been done, but, if so, it will be well to state the fact in the report.

Whatever the result of the competition may be, the Coal Smoke Abatement Society deserves the thanks of the community for its efforts to abate a serious nuisance, and at the same time to reduce the enormous waste of coal in domestic firegrates.

Memorial to John Knox, St. Giles' Cathedral, Edinburgh.—A statue of John Knox is to be placed in the Albany aisle of St. Giles' Cathedral. The architectural portion of the memorial will be about 18 ft. in height, and takes the form of a Gothic niche and canopy raised from the floor on a pedestal, and built against the wall. The statue itself is about 6 ft. high. Mr. Pittendrigh Macgillivray, R.S.A., is the sculptor, and the total cost, including foundation and erection, is estimated at 1,400*l*.

CONFERENCE ON SMOKE ABATEMENT

THIS week a Conference on Smoke Abatement, arranged by the Royal Sanitary Institute in conjunction with the Coal Smoke Abatement Society, is being held at the Royal Horticultural Society's Hall, Vincent-square, Westminster, and, in connexion with the Conference, there is an exhibition of smoke-abatement appliances. The exhibition was formally declared open by Sir Wm. Richmond on Tuesday night.

Sir Oliver Lodge, who was announced to have delivered a Presidential address, was, owing to illness, unable to be present, but sent some manuscript notes, which were read by Sir Wm. Richmond.

After remarking that the popular idea that coal smoke was a good disinfectant was wrong, since it contained much that was fatal to higher as well as to lower organisms, the author commented upon the large amounts of sulphurous acid present in the atmosphere of our cities, due to our barbarous methods of burning solid fuel. This acid when oxidised became oil of vitriol, a most destructive agent to living and other tissues. Sir Oliver Lodge then referred to the proposal that smoke and fog should be precipitated by electrification of the air, and pointed out that, while it was expensive to produce a fog, it would be still more costly to disperse it by the electrical method. This method of precipitation was only likely to prove useful for the disposition of valuable metallic and chemical fume, the product of manufacturing processes. The right way of dealing with a town fog, according to the author, was not to produce it. The difference between town and country fog was described in detail, and it was shown that the greater density and capacity of the former was the chief cause of its greater permanence. The connexion between fog and the imperfect combustion of solid fuel was then illustrated, and the need for improved methods of burning fuel both for domestic and manufacturing purposes was insisted on. The author now passed on to consider the three requisites for an improved method of burning fuel, and stated that these were:—(1) Purification of the fuel to be consumed; (2) proper means for effecting its complete combustion without production of dust or dirt; and (3) utilisation of the heat due to this combustion without waste. These three essentials of a more satisfactory method of burning solid fuel were then dealt with by the author in detail, and it was shown that the gasification of the solid fuel, at the pit's mouth or in some central gas-producing plant, and transmission of the gas, as Mond or water-gas, to the localities where it was to be used for heating purposes, was the only method that satisfactorily solved all the difficulties of the problem. The common objections to gas-fires for household use were then disposed of by the author, and it was pointed out that when proper and adequate provision for carrying off the products of combustion was made gas-fires were less detrimental to health, and far more cleanly than coal fires. But the gas-fire, as ordinarily used, was unscientific, and gave in many cases just cause for complaint as to its healthiness. The remainder of Sir Oliver Lodge's paper dealt with the technical side of the combustion of solid fuel in steam boilers, and on this subject he gave it as his opinion that the steam boiler, even at its best, is an unsatisfactory appliance for converting the energy of coal into mechanical energy, and that in time the use of gaseous fuel and gas engines will oust the steam boiler and all forms of steam engine from our works and factories. The transmission of all the heat of the burning fuel through the plates of a steam boiler could never be realised, and the conditions which best favoured heat transmission were exactly those which favoured the production of smoke and flame in the furnace of the boiler. On this account the problem of the smokeless combustion of solid fuel in the case of steam boilers was more difficult than many had yet realised.

Is London Fog Inevitable?

Dr. W. N. Shaw followed with a paper on "Is London Fog Inevitable?" and remarked that no one would assert that there was anything physically impossible in the idea of dispensing with coal smoke, although there might be some who were of opinion that if there were to be fogs, in any case, the effort necessary to keep them clean was not worth the trouble and expense. From the observations of Mr. Lempfert during the winter of 1902-3, it appeared that, if his figures could be accepted, they had about 20 per cent. of London fogs to deal with absolutely, as the lawyers would say, and the remainder depended on physical processes which were not within their control. In so far as anyone's action in regard to the smoke question may depend upon the effect of smoke on the frequency or intensity of fog, it would appear from the evidence now possessed that the abolition of coal smoke would cut off 20 per cent. of fogs altogether, that it would add most materially to the power of the sun to dissipate fogs, and thus indirectly reduce their duration. The abolition of the dirt and the restoration of something like their natural heritage of daylight would be incidental advantages which were by no means unworthy of consideration.

On Wednesday Sir George Livesey presided over the conference, and in opening the proceedings remarked that there was hope for London, for the abatement of its smoke had begun. Gaseous firing, the gas engine, and the dynamo were potent agents for the diminution of smoke. Within the last ten or twelve years, by the introduction of the penny-in-the-slot meter, almost the whole of the wage-earning classes of London had been supplied with gas. Of the 834,000 customers of the Gas Light, the South Metropolitan, and the Commercial gas companies, 80 per cent. used gas stoves for cooking. Substitute coal for all this gas, and what would be the condition of London? The difficult task, however, on which the advocates of smoke abatement must concentrate their attention if they were to succeed was the domestic fire used for heating, and the main hope in this direction lay in smokeless solid fuel or gaseous fuel of some kind. The great desideratum for smoke abatement was cheap gaseous fuel. There were two difficulties in the way of this, one being the opposition of the London County Council to the gas companies' efforts to obtain Parliamentary sanction to reduce illuminating power, and the second being that the gas companies had not yet found the gaseous fuel suitable for the purpose. They wanted freedom to work in this latter direction, and the method of testing that came into force with the new year would give them a certain measure of freedom to start towards the goal of a cheap fuel gas.

The Abatement of Smoke from Private Houses.

Mr. H. A. Des Vœux, M.D., in a paper on this subject, said it was our prevailing national fault—conservatism—which had prevented us from facing the problem of coal smoke, a disgrace to our civilisation, and a slur on our intelligence. He thought it might be taken for granted that, in the majority of English houses, the cooking was still done by coal in an open fire, and that sitting-rooms and bedrooms were heated in a similar manner, and that the inhabitants of the houses were thoroughly satisfied with their methods. Most people would consider it an act of tyranny if they had to change their ways. Broadly speaking, it might be said that there was no such thing as smokeless open coal fires, but that, under efficient conditions of management, there were vast differences in the smokiness of fires, that those which give the greatest amount of heat for the least amount of coal consumed emit the smallest amount of smoke, and that therefore efficient coal fires were to a certain extent smoke abaters. If we want our atmosphere absolutely cleared of smoke, we shall have to give up the use of crude bituminous coal and use some of its products, such as gas or electricity, or some smokeless fuel; and he believed that it was not the sanitarians who were going to lead the way, but a person much more useful and practical in serving the needs of mankind—i.e., the cook. It was she who had found out that a gas kitchener was essential in a house. But, unfortunately, smoke was still emitted from the kitchen chimney, for in all moderately large houses it was necessary to have a hot-water system as well, and in most houses the old coal range was lighted for this purpose. How, then, could the hot water be supplied? Eight years ago he installed a coke boiler, and each year he was more satisfied with it. It had given a magnificent hot-water supply throughout the house at a temperature of about 170 deg. Fahr., and the supply had been so plentiful that he had been enabled to put on three hot-water radiators into passages. The cost of this system was from 1s. 3d. to 2s. a week, depending mostly on the price of coke. With a gas cooker and a coke boiler, the difficulties of a hot-water system and the warmth of the kitchen were surmounted. If this system were intalled in all the houses in London, the greater part of the smoke from private houses would be prevented. As to the sitting and bed rooms, the problem was easier. He had a gas log fire in his consulting-room, an anthracite closed stove in his dining-room, an open coal fire (the Florence grate) in his morning-room, and gas fires in his bedrooms. With regard to gas fires in sitting and bed rooms, the greatest objections to them of which he was aware were the reputed drying of the atmosphere, and the sentimental objections that they were not so pleasant to look upon and that they could not be poked! To take the last first. Verily such a trivial objection ought not to stand in the way of a great sanitary improvement, and he wondered how often each of those present daily poked his fire! The second objection was a greater one, for there was no pleasanter sensation than the sight of a bright-burning coal fire when we enter a room cold and tired. But what about the same fire which the housemaid had allowed almost to go out, and buried the burning coals with 5 in. or 6 in. of fresh fuel! The first objection was a real one, if true. Personally, he found that if he burnt a gas fire in a room with no ventilation, a peculiar sensation of dryness was produced, but he had discovered that it is readily removed by opening the window an inch or two. This was therefore an advantage, and not a drawback; and there was certainly less draught in a room with a gas fire than a coal fire. With regard to cost, he would only say that he thought in his own house cooking by gas was slightly (10 per cent. or less) dearer than by coal; but that, like salt, it was not the amount that was consumed that costs the money, but the amount we waste. He gave some figures showing the enormous increase in the employment of gas stoves during the last ten years—figures which proved that it was the small consumers and poorer people who were using them more and more.

Other sources of heat were available for sitting-rooms: electric heaters, anthracite stoves open or closed, coke and other smokeless fuels. Of these, electric heaters were becoming more and more used, and, since the electric companies had wisely reduced their prices for current, he had no doubt that they would rapidly be introduced into houses; emitting no smoke and no fumes, they were bright and cheery, requiring only a switch to turn them on and off. They were ideal from the point of view of a sanitarian (except that they did not help in the ventilation of a room), and he wished them all success. Anthracite open fires were absolutely smokeless; they gave a great heat, they were efficient ventilators, but the fire was not so bright or quite so lively as a bituminous coal fire, and it was somewhat difficult to light. He did not believe that it was costly in burning, although the coal was dearer than ordinary coal. Closed stoves, mostly of French and German origin, burning anthracite were more and more used; they were alight night and day, need only be stoked once in twenty-four hours, were very economical (his cost 3d. for twenty-four hours), but they were cheerless things, and in his opinion were best fitted for dining-rooms, which were only used at certain intervals of the day, or in halls or passages, where they were excellent. Oil stoves were cheap and economical, very useful in halls and passages, but not quite suitable for sitting and bed rooms. Hot-water and steam systems through a house were not common in England, but he thought that by reason of their economy and labour-saving advantages they would be more employed.

He wished to emphasise the fact that he had aimed at proving that the problem of a smoky atmosphere from house warming was not a hopeless one, that what he and a few others had done was to show one way, not all the ways. Our first great fight must be to insist on smokeless cooking, and fortunately

it was the easiest to obtain, because cook was already converted, and to get rid of the open coal cooker we have only to substitute an easily-managed coke boiler. Smokeless cooking would rid us of 600,000 dirty chimneys, and the effect would be so enormous that our proselytising would no longer be required. If we obtained this, smokeless heating would follow in due time, and for those who insist on having an open coal fire, it should be a *sine quâ non* that only those grates are allowed which had already been tested by some public authority as to their efficiency. Not for many years would it be possible to eliminate entirely the open coal sitting-room fire.

He appealed to all those who were interested in public health, to those who delight in architecture and in art, to those who preach efficiency and economy, and to those who prize a clean house and a clean collar, to ponder over this question themselves. Do not let anyone consider that his or her little mite will not help. Every person who became a smoke abater in his own house became a centre from which information could be given to others, and small beginnings would lead to great endings. If public opinion could once be aroused to the grand results which would follow the cleansing of an atmosphere; if the inhabitants of the cities of England could be made to believe that the sun could once again pour his beneficent light and heat into the dark corners of our streets, he for one could not doubt that they would demand that steps should be taken to bring about this most desirable end, and terminate once and for all the murkiness and dulness of the atmosphere, which we all dread and deplore.

Coke as Domestic Fuel.

Sir Charles Cookson had prepared a paper on "Coke (charred coal) as Domestic Fuel," which was, in his absence, read by Dr. Mortimer. The author narrated his own experience of the use of coke as the only fuel in the seven grates in his own house at Cheyne-walk. When he first came to London from Egypt, disgusted at the contrast of the atmosphere, he determined not to contribute to the nuisance, and that the only way to abate smoke was not to create it, and that was to burn only smokeless fuel. He tried anthracite for a time, but soon took to coke on account of its greater cheapness as well as its far higher power of radiating heat. The initial difficulty which he found in the use of both these smokeless fuels was in lighting them, but he easily overcame that by putting under the grate an iron pipe connected with the gas service of the house, and perforated by air holes at the side so that the gas when lit reached the coke laid on the lower bars of the grate. The flow of gas was controlled by a Bunsen burner higher up in the pipe. It took about ten minutes to ignite the coke, and after that the gas was turned off, and the fire kept up for the rest of the day by coke alone. In this way he believed he had satisfactorily solved the question of the abolition of that large part of the smoke nuisance which arose from the domestic chimney.

Smoke Abatement in Leeds.

Professor J. B. Cohen (Leeds University) placed before the Conference the work of the Leeds Smoke Abatement Society. It was estimated that 4,000 tons of coal were daily consumed in Leeds, which, at ½ per cent., meant 20 tons of soot passing into the air. As to the remedies for the domestic hearth there was no doubt that the evil of smoke might be met if more attention were paid to the use of gas fire. From experiments he had made he was convinced that, with proper chimney draught, the alleged emission of noxious gases into a room was a myth. As to the emission of black smoke from factory chimneys the system of municipal smoke inspection was ridiculous, especially when one considered that the smoke inspector was generally a former fireman or stoker who was probably receiving not more than the wages of a skilled artisan. To meet the difficulty his Society had pressed for the inclusion of all factory chimneys in the Alkali Act, so as to place the whole matter of smoke in the hands of experts, just as the control of noxious fumes were under the careful supervision of the Government alkali inspectors. The Government departments had declined to receive a deputation on the subject, but, nevertheless, they in the North were still convinced that these were the lines which were most conducive to the effective solution of the smoke problem.

The Acids of Smoke.

Dr. Samuel Rideal, in a paper on this subject, discussed the evil effects arising from the acid gases associated with all kinds of coal-smoke. He pointed out their injurious action on exposed fabrics and on building stones, and drew attention to Dolomite limestone in particular, of which Westminster Palace was built, as a stone which appeared to be most affected, owing to the solubility of the magnesium sulphate formed. Oolitic and Portland limestones, of which St. Paul's is built, he found contained little or no magnesium carbonate, and were far more durable in acid town air. A baryta wash seemed to be one of the best antidotes. With regard to iron, as in the case of Charing Cross station, also they found that it rusted in the presence of sulphuric acid at a far greater rate than iron in a country railway-station. As they came nearer to London the sulphur in the iron increased. Twelve miles from London it amounted to about 3 per cent. of sulphate of iron in the oxide of iron, while in London itself the iron rust had a quantity of sulphate which was about 10 per cent. of the oxide of iron. The agitation within recent years in Parliament for the removal of the sulphur clauses from coal-gas Acts, elicited the fact that the amount of sulphur given from coal was a thousand times greater than from gas, which, in the opinion of the author, was a thousand times more important. He referred to the possibility of the elimination of the free sulphur from coke, which would remove the chief objection to its extended use, and pointed out that coke, being free from black, sooty, and oily particles, the gases contained therein were more diffusible, quickly become dissipated into the greater volume of air, and when condensed by rain, or by contact with cold surfaces, were more dilute and less harmful than the corresponding amount of acid produced from coal consumption.

Distribution of Producer-Gas.

Mr. A. S. E. Ackermann spoke as to "The Distribution of Producer-Gas as a Means of Alleviating the Smoke Nuisance." To combat the smoke fiend his proposal was that producer-gas should be distributed to houses for warming and cooking, and to factories for industrial purposes. Producer-gas was made from the cheapest coal, and could be produced even on a small scale for 3½d. per 1,000 cubic feet. Producer-gas was suitable for practically all purposes for which ordinary gas could be used, except that it would not do for illuminating. Any such scheme must necessarily be very costly in the case of London; but, while recognising that the cost of such a scheme would be very great, they must not forget what an extremely costly thing the fog was to London, and how far-reaching were its evil effects. The Hon. Rollo Russell estimated that the total cost of fogs in London was over 5,000,000*l.* per annum, and so one year's cost would provide capital enough for a very large scheme.

Smoke Prevention and Coal Conservation.

Mr. Arthur J. Martin, in a paper on this subject, also advocated the use of gas in the way proposed by Mr. Ackermann, but was in favour of coal-gas being used because of the nuisance which would arise from the breaking-up of the streets if a new company was introduced. He suggested that gas should be generated at the pit's mouth, and conveyed to London in steel pipes at high pressure. A single line of 6-ft. pipe would bring from the Yorkshire coalfields a supply of gas equal in heating power to the whole of the coal burnt in the metropolis. The general substitution of gas for coal would do away with smoky fogs, not only without cost, but at a positive saving to the community. It would also relieve the streets from a large volume of slow and heavy traffic, and by supplying cheap fuel along the whole length of the pipe line would give facilities for the removal of manufacturing industries from the cities to the country.

Considerable discussion followed the papers.

Mr. Aitken Berry observed that, at the new Government offices at Westminster, the Office of Works had been making tests of grates, and they were convinced that at the present day grates could be supplied which could consume coal without a large production of smoke.

Mr. T. C. Horsfall referred to the Arnott grate which he had at use at his own house, and said he was prepared to pay all the costs of testing this grate, which was not patented.

Dr. Ormandy (Warrington) said that poor people had to take houses as they were, and therefore he thought the societies should try and get at the architectural societies and the builders' societies to get them to move in the matter.

Mr. T. G. Marsh (Manchester) deprecated trying to get the nuisance remedied by legislation, and urged that the way to get manufacturers to use smoke-prevention apparatus was to show that there was economy in doing so.

Mr. Karl Maskel pointed out that the effect of sulphuric acid on iron was not to be measured by the actual quantity which might be found in the iron, for its action was continual.

A resolution, moved by Mr. Des Vœux, to the effect that the London County Council be asked to seek powers to enforce smokeless methods of cooking in all new houses was rejected.

Mr. A. J. Martin moved a resolution to the effect that the Sanitary Institute and the Smoke Abatement Society be asked to join in a memorial to the Government setting forth the urgency of dealing with the question.

This was put to the meeting, and declared carried.

THE INSTITUTE OF SANITARY ENGINEERS.

In the unavoidable absence of Mr. J. A. Crowther, Professor E. G. Croker took the chair at the Holborn Restaurant on Wednesday night at the annual dinner of this Institute. Amongst those also present were Messrs. W. J. Dibden, W. E. Riley, Baldwin Latham, W. F. Smith, W. Whitaker, A. J. Martin, C. E. Butcher (Chairman of the Council), H. W. Hoskins (Hon. Secretary), etc.

Mr. R. Wright proposed the toast of the "Houses of Parliament," which was acknowledged by Mr. E. Bond, M.P.

Mr. Baldwin Latham, in submitting the toast of the "Institute of Sanitary Engineers," said that in his younger days they had no institution to assist them in their work. The only literature they had in those days were the reports of the General Board of Health. He was glad that that Institute had been established to assist the sanitary engineers, for what was to the interest of sanitary engineers was far more to the interests of the British public. The matters which they had discussed at their meetings were of the most useful character, and embraced such questions as those of combined drainage or separate drainage, which was a very vexed question on which thousands of pounds had been spent in law expenses. They had also considered whether iron or earthenware pipes should be used for house drainage; the sewage disposal in the case of towns, villages, and country houses; flood disposal; and the disposal of the waste of towns. He thought there was a great field open to them, for there was a vast difference between the sanitary conditions of the northern and southern portions of England. In the south they had much healthier populations, because they had more perfect systems for the disposal of sewage. It was for them to forward the principles of sanitary science, so that in future the north might be brought up to the standard of the south.

Mr. W. J. Dibden said that Mr. Baldwin Latham, in the few words he had addressed to them, had shown the scope of the Institute, and, as they were all members, it was needless for him to dilate on them further.

Mr. C. E. Butcher (Chairman of the Council) said the Association was fortunate in having an energetic body of gentlemen on their Council and as officers. He would specially mention Mr. Hoskins, their hon. secretary, who had done such good work since his appointment that the Institute was

rapidly extending its influence, which would be made apparent to all members on the publication of the transactions early in the new year. An institution which brought together a large number of gentlemen engaged in sanitary work in a private capacity, and also gentlemen in the service of various municipal authorities, was bound to have discussions which were of benefit to both branches of the profession. Their Institute with such a combination of members should, in the near future, bring influence to bear on the Government to appoint that much talked about and sorely needed Minister of Public Health. Last summer they had a successful meeting at Southampton, and next year the meeting would take place at Manchester. During the year seventy-four new members had been enrolled, forty-one of whom had been elected in the last six months. A number of gentlemen present in the engineering and architectural world had also joined the Institute as hon. members. At their recent London examination seventeen candidates presented themselves, while at Sheffield they had eight candidates. In conclusion, he thought the Institute was to be congratulated on having their chairman as their President for 1906, for he had already given an example of his good intentions.

Mr. W. J. Dibden next proposed the toast of "Kindred Associations," and mentioned that they had with them gentlemen associated with the Institution of Civil Engineers, the Royal Institute of British Architects, the Royal Sanitary Institute, and other associations.

Mr. W. Whitaker (late Chairman of the Council of the Royal Sanitary Institute) replied, and said there was room for a great many societies. He thought the sanitary engineers were right in having their own society, for they would be able to assist themselves, and also assist other societies.

Mr. J. Farley proposed the toast of "The Visitors."

Mr. W. E. Riley responded, and said that when the present King was attacked with typhoid fever his first conscious words were: "If I were not a prince I would try to be a plumber." Subsequently he (the speaker) was telling this tale to a shop-keeper, and the shop-keeper said: "If I were not a shop-keeper I would be a sanitarian." If they cast their minds back and remembered the kind of sanitation which existed thirty years ago, and then saw the modern scientific interpretation of the word sanitation, they ought to be exceedingly grateful that such societies as this had been organised, and were flourishing.

Mr. Riviere also responded to the toast.

The toasts of "The Press" and "The Chairman" were also drunk.

PAYMENT OF DISTRICT SURVEYORS BY SALARIES.

THE Building Act Committee of the London County Council reported as follows at the meeting of the Council on Tuesday:—

"The Council, on December 8, 1903, referred it to us to report whether it was advisable that the Council should exercise the powers conferred upon it by sect. 158 of the London Building Act, 1894, to pay fixed salaries to district surveyors instead of their being remunerated as at present by fees, due regard being had to the statutory responsibility of the district surveyors for the stability of buildings, etc., being in no way lessened. For some time prior to the passing of this reference by the Council, and subsequently, we have given most careful consideration to the question of the payment of district surveyors by salaries, and in the London Building Acts (Amendment) Bill, 1905, provisions were inserted with the object of facilitating the introduction of a proper system of payment by salaries. These provisions were, with other parts of the bill, withdrawn, and we have, therefore, since considered whether the Council could advantageously exercise the powers conferred upon it by sect. 158 of the London Building Act, 1894.

It does not appear to us to be necessary to dwell at any length upon the desirableness of substituting fixed salaries for the present system of payment by fees, but it is, of course, very important to consider carefully whether the change can be effected without detriment to the public interests and without injustice to the existing district surveyors. As regards the first point we would, however, state that in the districts just outside London, and also throughout the country, the officials entrusted with the supervision of building operations are remunerated by salaries paid direct by public authorities and not by fees paid by the persons whose work has to be supervised by them. We are strongly of opinion that the existence in London of a class of public officials remunerated by fees paid by the public is an anomaly, and that any practical proposals for substituting a system of payment by salaries would be in accord with public opinion.

As regards the question of practicability we think that before stating the conclusion we have arrived at, it may be convenient to indicate briefly the position of district surveyors under the London Building Acts. For the purposes of the administration of the London Building Acts, London is divided into districts, to each of which is appointed a district surveyor, whose duty it is to see that the provisions of the Acts are complied with, and in cases where there is any breach of such provisions to take proceedings in respect thereof, or to notify the Council if the provisions so contravened relate to any matter with which he is not authorised to deal.

Broadly speaking, it is unnecessary for a person erecting or altering a building to make any application to the Council so long as he complies with the provisions of the London Building Acts, but in many cases the Council has a discretionary power to allow some departure from the strict provisions of the Acts.

The district surveyors are remunerated for their services by fees paid by the builders according to a fixed scale laid down in the third schedule of the London Building Act, 1894. In dangerous structure cases the Council, who may employ any competent surveyor, but as a matter of practice employs the district surveyor, pays his fee and recovers it from the owner of the property, and in certain cases the Council also pays a fee to district surveyors for special services performed.

Sect. 158 of the Act of 1894 provides that "the Council may at any time by order cause such fixed salary as they may determine to be paid to any district surveyor by way of remuneration instead of fees, so that the amount of such remuneration be not less than the amount of the average of the fees for the last seven completed years preceding such determination, and thereupon the fees which would have been payable to such district surveyor in pursuance of this Act shall be paid to the Council and carried to the credit of the County Fund."

By sect. 160 of the Act a district surveyor is required to send to the Council within seven days after the first day of every month a return of all work supervised and special services performed by him in the exercise of his office within the previous month, and of all fees charged or received in respect thereof; and by sect. 162 the superintending architect is required to examine such returns and report to the Council if anything therein specified appears to be in any respect fraudulent or incorrect. The gross totals of the fees received by district surveyors during the seven years ended December 31, 1904, as stated in these returns, are as follows:—

	Gross fees for whole county.	Gross fees for the district of Penge which by the Local Government Act, 1899, was constituted an urban district council.
1898	£49,182 12 3	.... £499 18 9
1899	50,281 1 4	.... 610 7 9
1900	51,203 0 2	.... 662 12 7
1901	52,114 11 1	.... 529 9 3
1902	49,450 17 9	.... 128 6 6
1903	52,535 13 0	
1904	52,931 15 6	
	357,669 11 1	2,430 14 10
	2,430 14 10	
Total gross receipts for 7 years ended 31st December, 1904, excluding Penge	355,238 16 3	
Average of receipts for 7 years ended 1904, excluding Penge	£50,748 8 0	

It will be seen that the fees show an upward tendency, and that on these figures there would be a balance in favour of the Council of about 2,000*l.*, if the Council determined to proceed under sect. 158 of the Act and pay district surveyors by salaries. If it should be necessary for the purposes of such determination to calculate the salaries from the fees received during the seven years ending December 31, 1905, there is no reason to anticipate that when the figures for 1905 are available they will show any decrease on the figures for 1904, or that there will be any diminution in the estimated balance in favour of the Council.

It will be seen, therefore, that it is possible for the Council to at once determine that district surveyors shall be paid by salary at an early date without involving any charge on the rates. We do not, however, think that this alone would be sufficient, as the work of a district might greatly increase or decrease after the salary for the district had been fixed. Moreover, the present districts vary both in area and value remuneration received by the existing district surveyors ranging from about 2,000*l.* to 200*l.* The conditions of service of the district surveyors also vary; some are wholly unrestricted as to private practice; some are prohibited from practising in their own districts, but may practise elsewhere and others (those appointed since 1890) are required to give their whole time to the duties and are prohibited from taking any private practice whatever. The Council has for years past, as opportunities have occurred, sought to make the districts more uniform in value and area. We therefore think that if the Council should determine to pay district surveyors by salaries, it should at the same time lay down the lines upon which future rearrangements of districts should proceed, and we have accordingly drawn up what for convenience of reference may be termed a model scheme. This scheme provides for the division of London into thirty-three districts, each district consisting, as far as possible, of one or more county electoral divisions. We suggest that for sixteen of these districts a salary of 1,000*l.* a year net, for eleven districts a salary of 800*l.* a year net, and for the remaining six districts a salary of 500*l.* a year net should be paid to the district surveyor, and that in each case the expense of the necessary clerical and professional assistance required by the district surveyor, and the office expenses, should be borne by the Council.

The total estimated cost of the scheme is about 40,245*l.*, and as the fees received during the year ended December 31, 1904, amounted to nearly 53,000*l.*, there would be, if it were possible to adopt the scheme in its entirety on a certain date, a very substantial margin to secure the Council against loss by shrinkage of fees, etc. There are, however, at the present moment, fifty-seven district surveyors' districts, seven of which are vacant, and the scheme could not be put into operation at once without involving the compulsory retirement of seventeen district surveyors, and thereby entailing the payment of a large amount of compensation.

We are of opinion, however, that if the Council proceeds at once to exercise the powers it possesses under sect. 158 of the London Building Act, 1894, many of the present district surveyors will be prepared to co-operate with the Council with a view to facilitating the speedy adoption, and ensuring the success, of the model scheme, or a scheme similar to it in all essential respects.

We would point out that the question of the payment of district surveyors by salaries was considered by the Council on June 17, 1890, and July 1, 1890, and that the Building Act Committee at that time reported as follows:—

"If the plan were adopted of paying district surveyors a fixed salary based upon the average fees for the previous three years (and this, it appears from the Act, must be the basis for such payment), we think that injustice might be done to a district surveyor in whose district building operations were increasing, because although extra work would devolve upon him, the Council would be receiving the increased fees. The system would be equally unsatisfactory in the case of a district where the fees might fall either from diminished building operations, or from a cause which may be suggested, viz., that a salaried district surveyor might not be so anxious to recover the fees as at present."

We have very carefully considered the reasons which led the Council in 1890 to decide to continue the system of payment by fees, and we are of opinion that the first, which was based on the probability of the amount of work in any given district varying from time to time, will be adequately met by the adoption of a model scheme such as we have suggested. As to the possibility of loss of fees it has to be remembered that the conditions of service have largely changed since 1890, and we do not fear that district surveyors will, if paid fixed salaries, be less anxious than they are at present to recover the fees due from builders.

There are two further points to which we would draw attention. First, as to the collection of the fees payable to district surveyors; this we think could be most conveniently and economically performed by the district surveyors. In the second place, the fees payable to district surveyors for the duties which they will be required to perform under the London Building Acts (Amendment) Act, 1905, will be payable to the district surveyors, whether district surveyors are paid in future by salaries or continue to receive their remuneration as at present from the fees paid by builders. The greater part of the fees payable under this Act will, however, cease when existing buildings have been dealt with. Moreover, we anticipate that if the Council adopt the model scheme suggested, it will be possible to arrange for district surveyors appointed in the future to accept a fixed salary to cover all services performed by them under any of the Building Acts.

There are at the present moment seven districts vacant, and, owing to some of the present district surveyors being of an advanced age, it is not unlikely that more vacancies will occur in the near future. Some of the vacant districts have been vacant for a considerable time, and it is extremely desirable that permanent arrangements should be made for their supervision without further delay. The present time is therefore an opportune one for the Council to deal with the matter, and such a favourable opportunity is not likely to occur again in the near future. For financial reasons it would be most convenient that the change, if adopted, should take effect as from April 1, 1906. As there will be a great deal of work in connexion with the detail arrangements which will have to be made if the Council shall decide to pay district surveyors by salaries, it is most desirable that the matter should be dealt with by the Council, if possible, before the recess. We have been in communication with the Finance Committee on the subject, and as soon as they are prepared to report we will submit definite recommendations to the Council.

We would add that we are advised that the responsibility of the district surveyors will be in no way altered, or their status affected, if the Council shall decide to pay them by salaries.

In the meantime, in view of the importance of the matter and in order to enable our proposals to be easily understood, we have caused a cartoon "plan, showing the existing districts, to be exhibited in the Council chamber, and also one showing the districts as proposed in the "model" scheme."

The matter was not discussed at Tuesday's meeting.

PUBLIC BATHS, GOOLE.—Major E. Hind, V.D., laid the foundation-stone of new public baths for Goole on the 6th inst. The plans for the baths have been prepared by Mr. E. H. Barber, Surveyor to the Goole Urban Council, and the estimated cost of the complete building is 3,000*l.* The scheme includes a swimming bath, contained in a room 86 ft. long by 46 ft. wide, with dressing boxes and galleries, shower, needle, and soap baths. The swimming bath is 75 ft. long by 30 ft. wide, the depth ranging from 3 ft. to 6 ft. There are also three private slipper baths, and the baths will be complete with offices, store-rooms, laundry, calorifier, and boiler-house.

it was the easiest to obtain, because cook was already converted, and to get rid of the open coal cooker we have only to substitute an easily-managed coke boiler. Smokeless cooking would rid us of 600,000 dirty chimneys, and the effect would be so enormous that our proselytising would no longer be required. If we obtained this, smokeless heating would follow in due time, and for those who insist on having an open coal fire, it should be a *sine quâ non* that only those grates are allowed which had already been tested by some public authority as to their efficiency. Not for many years would it be possible to eliminate entirely the open coal sitting-room fire.

He appealed to all those who were interested in public health, to those who delight in architecture and in art, to those who preach efficiency and economy, and to those who prize a clean house and a clean collar, to ponder over this question themselves. Do not let anyone consider that his or her little mite will not help. Every person who became a smoke abater in his own house became a centre from which information could be given to others, and small beginnings would lead to great endings. If public opinion could once be aroused to the grand results which would follow the cleansing of an atmosphere; if the inhabitants of the cities of England could be made to believe that the sun could once again pour his beneficent light and heat into the dark corners of our streets, he for one could not doubt that they would demand that steps should be taken to bring about this most desirable end, and terminate once and for all the murkiness and dulness of the atmosphere, which we all dread and deplore.

Coke as Domestic Fuel.

Sir Charles Cookson had prepared a paper on "Coke (charred coal) as Domestic Fuel," which was, in his absence, read by Dr. Mortimer. The author narrated his own experience of the use of coke as the only fuel in the seven grates in his own house at Cheyne-walk. When he first came to London from Egypt, disgusted at the contrast of the atmosphere, he determined not to contribute to the nuisance, and that the only way to abate smoke was not to create it, and that was to burn only smokeless fuel. He tried anthracite for a time, but soon took to coke on account of its greater cheapness as well as its far higher power of radiating heat. The initial difficulty which he found in the use of both these smokeless fuels was in lighting them, but he easily overcame that by putting under the grate an iron pipe connected with the gas service of the house, and perforated by air holes at the side so that the gas when lit reached the coke laid on the lower bars of the grate. The flow of gas was controlled by a Bunsen burner higher up in the pipe. It took about ten minutes to ignite the coke, and after that the gas was turned off, and the fire kept up for the rest of the day by coke alone. In this way he believed he had satisfactorily solved the question of the abolition of that large part of the smoke nuisance which arose from the domestic chimney.

Smoke Abatement in Leeds.

Professor J. B. Cohen (Leeds University) placed before the Conference the work of the Leeds Smoke Abatement Society. It was estimated that 4,000 tons of coal were daily consumed in Leeds, which, at ½ per cent., meant 20 tons of soot passing into the air. As to the remedies for the domestic hearth there was no doubt that the evil of smoke might be met if more attention were paid to the use of gas fire. From experiments he had made he was convinced that, with proper chimney draught, the alleged emission of noxious gases into a room was a myth. As to the emission of black smoke from factory chimneys the system of municipal smoke inspection was ridiculous, especially when one considered that the smoke inspector was generally a former fireman or stoker who was probably receiving not more than the wages of a skilled artisan. To meet the difficulty his Society had pressed for the inclusion of all factory chimneys in the Alkali Act, so as to place the whole matter of smoke in the hands of experts, just as the control of noxious fumes were under the careful supervision of the Government alkali inspectors. The Government departments had declined to receive a deputation on the subject, but, nevertheless, they in the North were still convinced that these were the lines which were most conducive to the effective solution of the smoke problem.

The Acids of Smoke.

Dr. Samuel Rideal, in a paper on this subject, discussed the evil effects arising from the acid gases associated with all kinds of coal-smoke. He pointed out their injurious action on exposed fabrics and on building stones, and drew attention to Dolomite limestone in particular, of which Westminster Palace was built, as a stone which appeared to be most affected, owing to the solubility of the magnesium sulphate formed. Oolitic and Portland limestones, of which St. Paul's is built, he found contained little or no magnesium carbonate, and were far more durable in acid town air. A baryta wash seemed to be one of the best antidotes. With regard to iron, as in the case of Charing Cross station, also they found that it rusted in the presence of sulphuric acid at a far greater rate than iron in a country railway-station. As they came nearer to London the sulphur in the iron increased. Twelve miles from London it amounted to about 3 per cent. of sulphate of iron in the oxide of iron, while in London itself the iron rust had a quantity of sulphate which was about 10 per cent. of the oxide of iron. The agitation within recent years in Parliament for the removal of the sulphur clauses from coal-gas Acts, elicited the fact that the amount of sulphur given from coal was a thousand times greater than from gas, which, in the opinion of the author, was a thousand times more important. He referred to the possibility of the elimination of the free sulphur from coke, which would remove the chief objection to its extended use, and pointed out that coke, being free from black, sooty, and oily particles, the gases contained therein were more diffusible, quickly become dissipated into the greater volume of air, and when condensed by rain, or by contact with cold surfaces, were more dilute and less harmful than the corresponding amount of acid produced from coal consumption.

Distribution of Producer-Gas.

Mr. A. S. E. Ackermann spoke as to "The Distribution of Producer-Gas as a Means of Alleviating the Smoke Nuisance." To combat the smoke fiend his proposal was that producer-gas should be distributed to houses for warming and cooking, and to factories for industrial purposes. Producer-gas was made from the cheapest coal, and could be produced even on a small scale for 3½d. per 1,000 cubic feet. Producer-gas was suitable for practically all purposes for which ordinary gas could be used, except that it would not do for illuminating. Any such scheme must necessarily be very costly in the case of London; but, while recognising that the cost of such a scheme would be very great, they must not forget what an extremely costly thing the fog was to London, and how far-reaching were its evil effects. The Hon. Rollo Russell estimated that the total cost of fogs in London was over 5,000,000*l.* per annum, and so one year's cost would provide capital enough for a very large scheme.

Smoke Prevention and Coal Conservation.

Mr. Arthur J. Martin, in a paper on this subject, also advocated the use of gas in the way proposed by Mr. Ackermann, but was in favour of coal-gas being used because of the nuisance which would arise from the breaking-up of the streets if a new company was introduced. He suggested that gas should be generated at the pit's mouth, and conveyed to London in steel pipes at high pressure. A single line of 6-ft. pipe would bring from the Yorkshire coalfields a supply of gas equal in heating power to the whole of the coal burnt in the metropolis. The general substitution of gas for coal would do away with smoky fogs, not only without cost, but at a positive saving to the community. It would also relieve the streets from a large volume of slow and heavy traffic, and by supplying cheap fuel along the whole length of the pipe line would give facilities for the removal of manufacturing industries from the cities to the country.

Considerable discussion followed the papers.

Mr. Aitken Berry observed that, at the new Government offices at Westminster, the Office of Works had been making tests of grates, and they were convinced that at the present day grates could be supplied which could consume coal without a large production of smoke.

Mr. T. C. Horsfall referred to the Arnott grate which he had at use at his own house, and said he was prepared to pay all the costs of testing this grate, which was not patented.

Dr. Ormandy (Warrington) said that poor people had to take houses as they were, and therefore he thought the societies should try and get at the architectural societies and the builders' societies to get them to move in the matter.

Mr. T. G. Marsh (Manchester) deprecated trying to get the nuisance remedied by legislation, and urged that the way to get manufacturers to use smoke-prevention apparatus was to show that there was economy in doing so.

Mr. Karl Maskel pointed out that the effect of sulphuric acid on iron was not to be measured by the actual quantity which might be found in the iron, for its action was continual.

A resolution, moved by Mr. Des Vœux, to the effect that the London County Council be asked to seek powers to enforce smokeless methods of cooking in all new houses was rejected.

Mr. A. J. Martin moved a resolution to the effect that the Sanitary Institute and the Smoke Abatement Society be asked to join in a memorial to the Government setting forth the urgency of dealing with the question.

This was put to the meeting, and declared carried.

THE INSTITUTE OF SANITARY ENGINEERS.

In the unavoidable absence of Mr. J. A. Crowther, Professor E. G. Croker took the chair at the Holborn Restaurant on Wednesday night at the annual dinner of this Institute. Amongst those also present were Messrs. W. J. Dibden, W. E. Riley, Baldwin Latham, W. F. Smith, W. Whitaker, A. J. Martin, C. E. Butcher (Chairman of the Council), H. W. Hoskins (Hon. Secretary), etc.

Mr. R. Wright proposed the toast of the "Houses of Parliament," which was acknowledged by Mr. E. Bond, M.P.

Mr. Baldwin Latham, in submitting the toast of the "Institute of Sanitary Engineers," said that in his younger days they had no institution to assist them in their work. The only literature they had in those days were the reports of the General Board of Health. He was glad that that Institute had been established to assist the sanitary engineers, for what was to the interest of sanitary engineers was far more to the interests of the British public. The matters which they had discussed at their meetings were of the most useful character, and embraced such questions as those of combined drainage or separate drainage, which was a very vexed question on which thousands of pounds had been spent in law expenses. They had also considered whether iron or earthenware pipes should be used for house drainage; the sewage disposal in the case of towns, villages, and country houses; flood disposal; and the disposal of the waste of towns. He thought there was a great field open to them, for there was a vast difference between the sanitary conditions of the northern and southern portions of England. In the south they had much healthier populations, because they had more perfect systems for the disposal of sewage. It was for them to forward the principles of sanitary science, so that in future the north might be brought up to the standard of the south.

Mr. W. J. Dibden said that Mr. Baldwin Latham, in the few words he had addressed to them, had shown the scope of the Institute, and, as they were all members, it was needless for him to dilate on them further.

Mr. C. E. Butcher (Chairman of the Council) said the Association was fortunate in having an energetic body of gentlemen on their Council and as officers. He would specially mention Mr. Hoskins, their hon. secretary, who had done such good work since his appointment that the Institute was

rapidly extending its influence, which would be made apparent to all members on the publication of the transactions early in the new year. An institution which brought together a large number of gentlemen engaged in sanitary work in a private capacity, and also gentlemen in the service of various municipal authorities, was bound to have discussions which were of benefit to both branches of the profession. Their Institute with such a combination of members should, in the near future, bring influence to bear on the Government to appoint that much talked about and sorely needed Minister of Public Health. Last summer they had a successful meeting at Southampton, and next year the meeting would take place at Manchester. During the year seventy-four new members had been enrolled, forty-one of whom had been elected in the last six months. A number of gentlemen present in the engineering and architectural world had also joined the Institute as hon. members. At their recent London examination seventeen candidates presented themselves, while at Sheffield they had eight candidates. In conclusion, he thought the Institute was to be congratulated on having their chairman as their President for 1906, for he had already given an example of his good intentions.

Mr. W. J. Dibden next proposed the toast of "Kindred Associations," and mentioned that they had with them gentlemen associated with the Institution of Civil Engineers, the Royal Institute of British Architects, the Royal Sanitary Institute, and other associations.

Mr. W. Whitaker (late Chairman of the Council of the Royal Sanitary Institute) replied, and said there was room for a great many societies. He thought the sanitary engineers were right in having their own society, for they would be able to assist themselves, and also assist other societies.

Mr. J. Farley proposed the toast of "The Visitors."

Mr. W. E. Riley responded, and said that when the present King was attacked with typhoid fever his first conscious words were: "If I were not a prince I would try to be a plumber." Subsequently he (the speaker) was telling this tale to a shop-keeper, and the shop-keeper said: "If I were not a shop-keeper I would be a sanitarian." If they cast their minds back and remembered the kind of sanitation which existed thirty years ago, and then saw the modern scientific interpretation of the word sanitation, they ought to be exceedingly grateful that such societies as this had been organised, and were flourishing.

Mr. Riviere also responded to the toast.

The toasts of "The Press" and "The Chairman" were also drunk.

PAYMENT OF DISTRICT SURVEYORS BY SALARIES.

THE Building Act Committee of the London County Council reported as follows at the meeting of the Council on Tuesday:—

"The Council, on December 8, 1903, referred it to us to report whether it was advisable that the Council should exercise the powers conferred upon it by sect. 158 of the London Building Act, 1894, to pay fixed salaries to district surveyors instead of their being remunerated as at present by fees, due regard being had to the statutory responsibility of the district surveyors for the stability of buildings, etc., being in no way lessened. For some time prior to the passing of this reference by the Council, and subsequently, we have given most careful consideration to the question of the payment of district surveyors by salaries, and in the London Building Acts (Amendment) Bill, 1905, provisions were inserted with the object of facilitating the introduction of a proper system of payment by salaries. These provisions were, with other parts of the bill, withdrawn, and we have, therefore, since considered whether the Council could advantageously exercise the powers conferred upon it by sect. 158 of the London Building Act, 1894.

It does not appear to us to be necessary to dwell at any length upon the desirableness of substituting fixed salaries for the present system of payment by fees, but it is, of course, very important to consider carefully whether the change can be effected without detriment to the public interests and without injustice to the existing district surveyors. As regards the first point we would, however, state that in the districts just outside London, and also throughout the country, the officials entrusted with the supervision of building operations are remunerated by salaries paid direct by public authorities and not by fees paid by the persons whose work has to be supervised by them. We are strongly of opinion that the existence in London of a class of public officials remunerated by fees paid by the public is an anomaly, and that any practical proposals for substituting a system of payment by salaries would be in accord with public opinion.

As regards the question of practicability we think that before stating the conclusion we have arrived at, it may be convenient to indicate briefly the position of district surveyors under the London Building Acts. For the purposes of the administration of the London Building Acts, London is divided into districts, to each of which is appointed a district surveyor, whose duty it is to see that the provisions of the Acts are complied with, and in cases where there is any breach of such provisions to take proceedings in respect thereof, or to notify the Council if the provisions so contravened relate to any matter with which he is not authorised to deal.

Broadly speaking, it is unnecessary for a person erecting or altering a building to make any application to the Council so long as he complies with the provisions of the London Building Acts, but in many cases the Council has a discretionary power to allow some departure from the strict provisions of the Acts.

The district surveyors are remunerated for their services by fees paid by the builders according to a fixed scale laid down in the third schedule of the London Building Act, 1894. In dangerous structure cases the Council, who may employ any competent surveyor, but as a matter of practice employs the district surveyor, pays his fee and recovers it from the owner of the property, and in certain cases the Council also pays a fee to district surveyors for special services performed.

Sect. 158 of the Act of 1894 provides that "the Council may at any time by order cause such fixed salary as they may determine to be paid to any district surveyor by way of remuneration instead of fees, so that the amount of such remuneration be not less than the amount of the average of the fees for the last seven completed years preceding such determination, and thereupon the fees which would have been payable to such district surveyor in pursuance of this Act shall be paid to the Council and carried to the credit of the County Fund."

By sect. 160 of the Act a district surveyor is required to send to the Council within seven days after the first day of every month a return of all work supervised and special services performed by him in the exercise of his office within the previous month, and of all fees charged or received in respect thereof; and by sect. 162 the superintending architect is required to examine such returns and report to the Council if anything therein specified appears to be in any respect fraudulent or incorrect. The gross totals of the fees received by district surveyors during the seven years ended December 31, 1904, as stated in these returns, are as follows:—

	Gross fees for whole county.	Gross fees for the district of Penge which by the Local Government Act, 1899, was constituted an urban district council.
1898	£49,152 12 3	£499 18 9
1899	50,281 1 4	610 7 9
1900	51,203 0 2	662 12 7
1901	52,114 11 1	529 9 3
1902	49,450 17 9	128 6 6
1903	52,535 13 0	
1904	52,931 15 6	
	357,669 11 1	2,430 14 10
	2,430 14 10	
Total gross receipts for 7 years ended 31st December, 1904, excluding Penge	355,238 16 3	
Average of receipts for 7 years ended 1904, excluding Penge	£50,748 8 0	

It will be seen that the fees show an upward tendency, and that on these figures there would be a balance in favour of the Council of about 2,000*l*., if the Council determined to proceed under sect. 158 of the Act and pay district surveyors by salaries. If it should be necessary for the purposes of such determination to calculate the salaries from the fees received during the seven years ending December 31, 1905, there is no reason to anticipate that when the figures for 1905 are available they will show any decrease on the figures for 1904, or that there will be any diminution in the estimated balance in favour of the Council.

It will be seen, therefore, that it is possible for the Council to at once determine that district surveyors shall be paid by salary at an early date without involving any charge on the rates. We do not, however, think that this alone would be sufficient, as the work of a district might greatly increase or decrease after the salary for the district had been fixed. Moreover, the present districts vary both in area and value remuneration received by the existing district surveyors ranging from about 2,000*l*. to 200*l*. The conditions of service of the district surveyors also vary; some are wholly unrestricted as to private practice; some are prohibited from practising in their own districts, but may practise elsewhere and others (those appointed since 1890) are required to give their whole time to the duties and are prohibited from taking any private practice whatever. The Council has for years past, as opportunities have occurred, sought to make the districts more uniform in value and area. We therefore think that if the Council should determine to pay district surveyors by salaries, it should at the same time lay down the lines upon which future rearrangements of districts should proceed, and we have accordingly drawn up what for convenience of reference may be termed a model scheme. This scheme provides for the division of London into thirty-three districts, each district consisting, as far as possible, of one or more county electoral divisions. We suggest that for sixteen of these districts a salary of 1,000*l*. a year net, for eleven districts a salary of 800*l*. a year net, and for the remaining six districts a salary of 500*l*. a year net should be paid to the district surveyor, and that in each case the expense of the necessary clerical and professional assistance required by the district surveyor, and the office expenses, should be borne by the Council.

The total estimated cost of the scheme is about 40,245*l*., and as the fees received during the year ended December 31, 1904, amounted to nearly 53,000*l*., there would be, if it were possible to adopt the scheme in its entirety on a certain date, a very substantial margin to secure the Council against loss by shrinkage of fees, etc. There are, however, at the present moment, fifty-seven district surveyors' districts, seven of which are vacant, and the scheme could not be put into operation at once without involving the compulsory retirement of seventeen district surveyors, and thereby entailing the payment of a large amount of compensation.

We are of opinion, however, that if the Council proceeds at once to exercise the powers it possesses under sect. 158 of the London Building Act, 1894, many of the present district surveyors will be prepared to co-operate with the Council with a view to facilitating the speedy adoption, and ensuring the success, of the model scheme, or a scheme similar to it in all essential respects.

We would point out that the question of the payment of district surveyors by salaries was considered by the Council on June 17, 1890, and July 1, 1890, and that the Building Act Committee at that time reported as follows:—

"If the plan were adopted of paying district surveyors a fixed salary based upon the average fees for the previous three years (and this, it appears from the Act, must be the basis for such payment), we think that injustice might be done to a district surveyor in whose district building operations were increasing, because although extra work would devolve upon him, the Council would be receiving the increased fees. The system would be equally unsatisfactory in the case of a district where the fees might fall either from diminished building operations, or from a cause which may be suggested, viz., that a salaried district surveyor might not be so anxious to recover the fees as at present."

We have very carefully considered the reasons which led the Council in 1890 to decide to continue the system of payment by fees, and we are of opinion that the first, which was based on the probability of the amount of work in any given district varying from time to time, will be adequately met by the adoption of a model scheme such as we have suggested. As to the possibility of loss of fees it has to be remembered that the conditions of service have largely changed since 1890, and we do not fear that district surveyors will, if paid fixed salaries, be less anxious than they are at present to recover the fees due from builders.

There are two further points to which we would draw attention. First, as to the collection of the fees payable to district surveyors; this we think could be most conveniently and economically performed by the district surveyors. In the second place, the fees payable to district surveyors for the duties which they will be required to perform under the London Building Acts (Amendment) Act, 1905, will be payable to the district surveyors, whether district surveyors are paid in future by salaries or continue to receive their remuneration as at present from the fees paid by builders. The greater part of the fees payable under this Act will, however, cease when existing buildings have been dealt with. Moreover, we anticipate that if the Council adopt the model scheme suggested, it will be possible to arrange for district surveyors appointed in the future to accept a fixed salary to cover all services performed by them under any of the Building Acts.

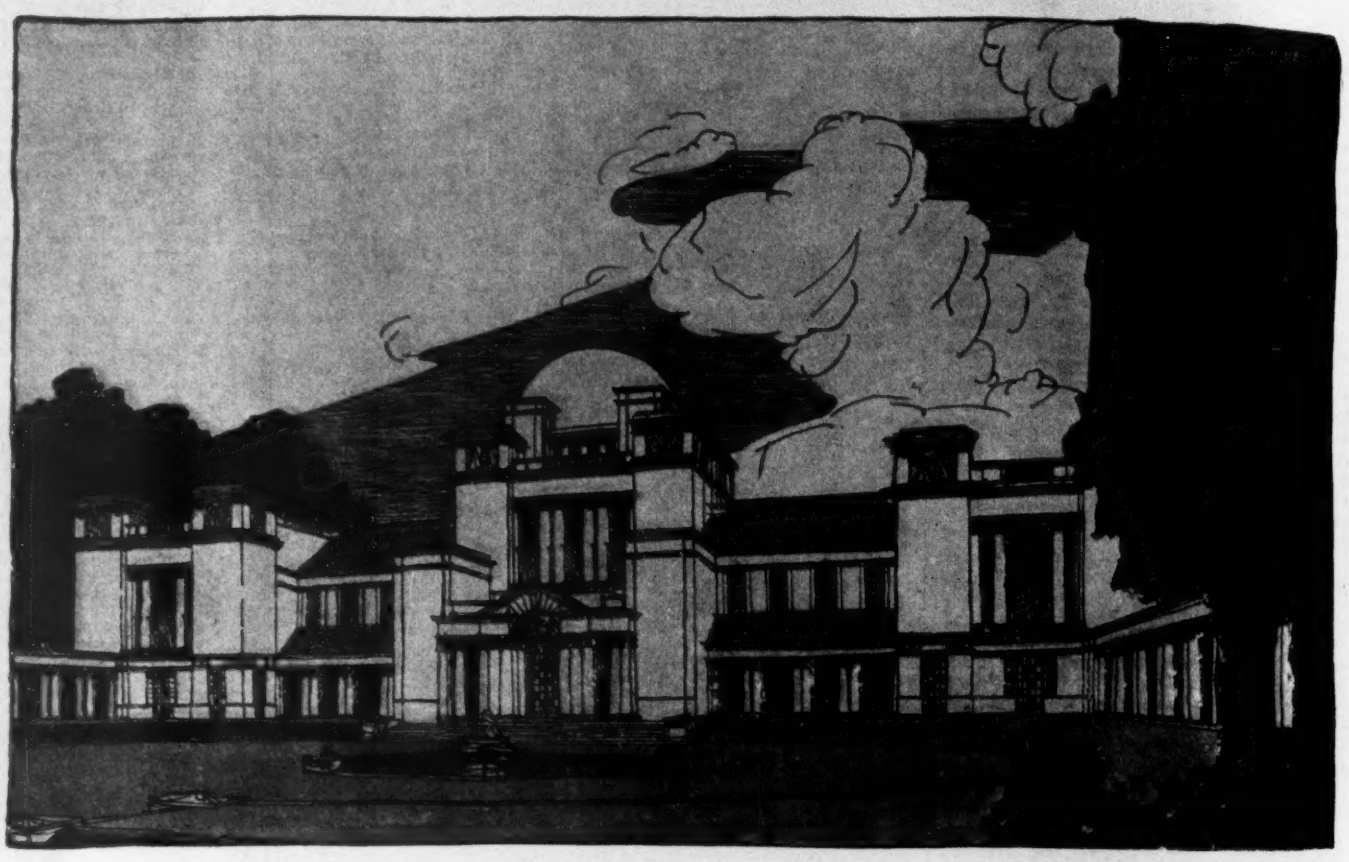
There are at the present moment seven districts vacant, and, owing to some of the present district surveyors being of an advanced age, it is not unlikely that more vacancies will occur in the near future. Some of the vacant districts have been vacant for a considerable time, and it is extremely desirable that permanent arrangements should be made for their supervision without further delay. The present time is therefore an opportune one for the Council to deal with the matter, and such a favourable opportunity is not likely to occur again in the near future. For financial reasons it would be most convenient that the change, if adopted, should take effect as from April 1, 1906. As there will be a great deal of work in connexion with the detail arrangements which will have to be made if the Council shall decide to pay district surveyors by salaries, it is most desirable that the matter should be dealt with by the Council, if possible, before the recess. We have been in communication with the Finance Committee on the subject, and as soon as they are prepared to report we will submit definite recommendations to the Council.

We would add that we are advised that the responsibility of the district surveyors will be in no way altered, or their status affected, if the Council shall decide to pay them by salaries.

In the meantime, in view of the importance of the matter and in order to enable our proposals to be easily understood, we have caused a cartoon "plan, showing the existing districts, to be exhibited in the Council chamber, and also one showing the districts as proposed in the "model" scheme."

The matter was not discussed at Tuesday's meeting.

PUBLIC BATHS, GOOLE.—Major E. Hind, V.D., laid the foundation-stone of new public baths for Goole on the 6th inst. The plans for the baths have been prepared by Mr. E. H. Barber, Surveyor to the Goole Urban Council, and the estimated cost of the complete building is 3,000*l*. The scheme includes a swimming bath, contained in a room 86 ft. long by 46 ft. wide, with dressing boxes and galleries, shower, needle, and soap baths. The swimming bath is 75 ft. long by 30 ft. wide, the depth ranging from 3 ft. to 6 ft. There are also three private slipper baths, and the baths will be complete with offices, store-rooms, laundry, calorifier, and boiler-house.



House at Buenos Aires: Perspective Sketch.

Fifty Years Ago.

FROM THE *Builder* OF DECEMBER 15, 1855.

THE DIPLOMA QUESTION.

MR. G. R. BURNELL, visitor, read a statement of the qualifications required for the examinations in the School of Mines and the School of Engineers, in Spain. Having resided for eight years on the Continent, he (the speaker) had ample experience of the diploma system, and it appeared to him that it had signally failed, and he believed if adopted compulsorily in England it would not produce any good result. The system, in fact, compelled those who aspired to public situations to go to the schools in which the particular education required for the diploma was given, and thus the tyranny of schools was substituted for the former tyranny of corporations. Moreover, a species of monopoly was established which was fatal to originality and individual character. The experience of the present war was not in favour of the system of examination in our own and other great military academies; indeed, the only really great general—Omar Pacha—had not gone through the discipline of the schools. Again, the French engineers were, perhaps, the most learned and scientific body in Europe, but (with the exception of the improvement of the lighthouse introduced by Fresnel) none of the great modern improvements in engineering had originated in France. The application of cast and wrought iron to buildings, the improvements in suspension-bridges, railways, docks, the electric telegraph, locomotive and other steam engines, gas lighting, etc., had all originated in England or America, where the profession was open to all comers and without monopoly; and this system, he was convinced, would be the safest and the best for the public.

Mr. Pocock, Fellow, observed that in a profession embracing both art and science, a system of examination must involve uncertainty and difficulty. One individual, with great natural talent, might possess small yet sufficient acquirements in science and practice. Another, with a small but sufficient modicum of art, might possess so large an amount of science as to make a better display than he whom nature had endowed with more of the talent of the artist. The great difficulty in the question, indeed, would be in dealing with the distinction between the architect as compared with the mere builder, and in conferring a diploma which should properly point out the qualifications of each. Even *a priori* he concurred in the *a posteriori* conclusions of Mr. Burnell, that the diploma system would lower, rather than raise, the standard of professional ability. There would be a great difficulty in fixing the exact standard for the examination. Unless it were sufficiently high, a great many men who now aspired only to rank as builders would be able to pass it, and the modesty which now restrained them from passing off as architects would not be felt if they could obtain a diploma as being properly qualified. A diploma would doubtless be valued by a young man, whom the public might hesitate to employ without it; but if the title of archtect was reduced in value by this proceeding, as he thought it would be, the young architect would no longer be thankful for it. —*From Report of Discussion at the Institute of Architects.*

Illustrations.

DECORATIVE PICTURE: "FLORA'S BOWER."

THIS picture, of life-size scale, occupied a prominent position in one of the rooms at the last Royal Academy Exhibition.

The artist, Mr. Robert Christie, writes: "I chose the subject of Flora attended by nymphs and wooed by Zephyr principally for what beauty I saw in it as regards colour and form. In the composition I have tried to get the flower-like feeling into the figures as well as the blossoms."

The mass of flowers, of course, adds very much to the decorative character of the work, which would make a fine decorative panel in such a position as the hall of a large mansion.

ROMAN MASONRY AT PEVENSEY.

THESE views of portions of the remains at Pevensey Castle are given as illustrations to the first article in this issue, in which they are referred to and described; and are from photographs specially made by the author of that article.

PROPOSED HOUSE AT BUENOS AIRES.

THE plans here given for a house and grounds at Buenos Aires are to be regarded as sketch plans, but even as such they show a very remarkable scheme of house and garden, and such as an architect has not often the chance of carrying out.

The house is to be constructed in bricks made from the material excavated for the artificial canals, faced with stucco. The panels in the towers are to be in coloured plaster in bas-relief, and the roofing in red pan-tiles; the house to be raised on a terrace 3 ft. high.

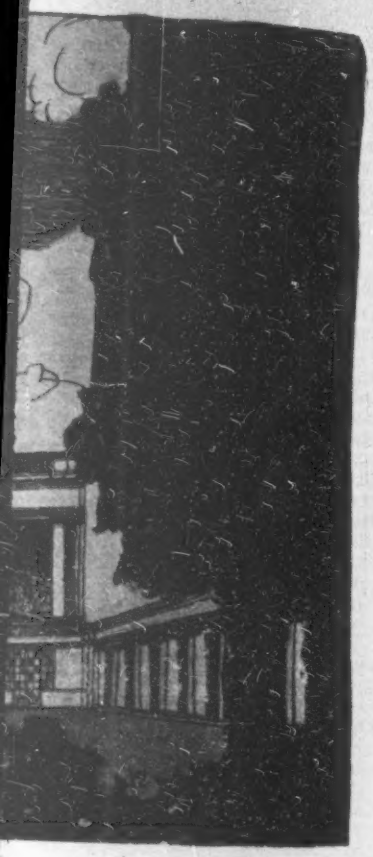
The design is by Mr. Leonard Nagington, whose name as an architect is new to us, but his sketches for the house and domain show a great deal of originality, and we may congratulate him on having a client who promises him such a fine opportunity.

FREE LIBRARY, CASTLEFORD.—The new free library, which has been erected at Castleford from funds provided by Mr. Andrew Carnegie, was opened on the 30th ult. The building was designed by Mr. H. C. V. Cale, architect, of Birmingham.

LAMBETH MUNICIPAL BUILDINGS.—At the meeting last week of Lambeth Borough Council the General Purposes Committee reported that the conditions of the appointment of Messrs. Warwick & Hall as the architects of the new municipal buildings specify that they are to be paid the usual 5 per cent. commission upon the total cost of the buildings, in accordance with the Royal Institute of British Architects' schedule, and that in the event of the Council giving no instructions to proceed with the work within twelve months of the award they shall be paid 300*l.*, and in the event of the scheme being abandoned or not proceeded with within five years of the award, they shall be paid 1¼ per cent. upon the estimated cost of the work. It was usual, the report continued, for the first payment on account of fees to be made to the architects on the signing of the contract with the builders. The sub-committee in charge of the matter pointed out, however, that in this case no premium (over and above the scale fees) is payable, that the contract is a large one, and that already the architects had done a very large amount of work. Under these circumstances it was recommended that the architects be paid 200*l.* on account. The report went on to state that only one firm out of the selected list of builders had intimated that it was not prepared to submit a tender, and that the quantities, specifications, and detail drawings had been sent out to the remainder of the firms. The report and recommendation were adopted.

INK PHOTO. SPRAGUE & C° LT° 4 & 5 EAST HARDING STREET, FETTER LANE, E.C.

DECORATIVE PAINTING: "FLORA'S BOWER."—By Mr. Robert Christie



SED HOUSE AT BUENOS AIRES.

plans here given for a house and at Buenos Aires are to be regarded h plans, but even as such they show remarkable scheme of house and and such as an architect has not often ce of carrying out.

ouse is to be constructed in bricks om the material excavated for the canals, faced with stucco. The the towers are to be in coloured n bas-relief, and the roofing in red ; the house to be raised on a ft. high.

esign is by Mr. Leonard Nagington, ame as an architect is new to us. sketches for the house and domain reat deal of originality, and we may ate him on having a client who him such a fine opportunity.

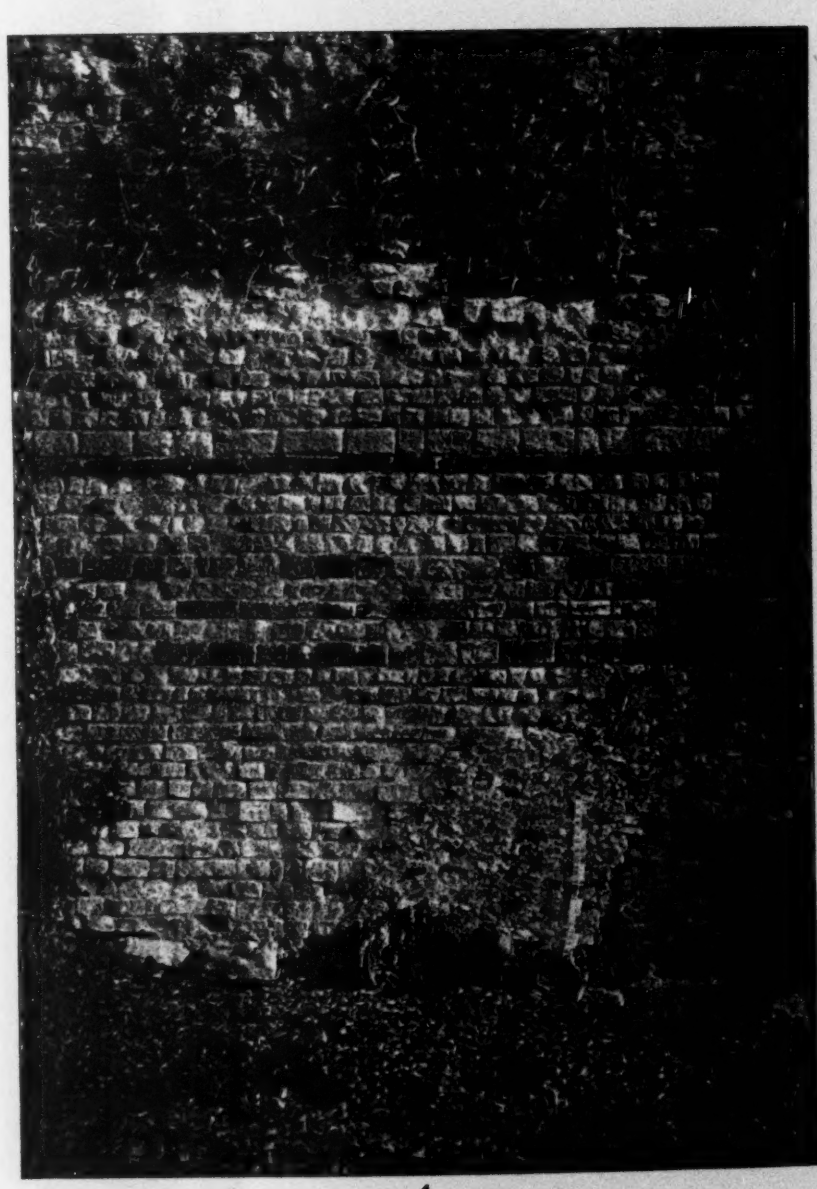
LIBRARY, CASTLEFORD.—The new free hich has been erected at Castleford from vided by Mr. Andrew Carnegie, was n the 30th ult. The building was by Mr. H. C. V. Cale, architect, of am.

H MUNICIPAL BUILDINGS.—At the meet- eek of Lambeth Borough Council the urposes Committee reported that the of the appointment of Messrs. Warwick the architects of the new municipal specify that they are to be paid the r cent. commission upon the total cost ldings, in accordance with the Royal of British Architects' schedule, and event of the Council giving no instruc- roceed with the work within twelve the award they shall be paid 300*l.*, and nt of the scheme being abandoned or ded with within five years of the award, be paid 1½ per cent. upon the estimated work. It was usual, the report con- the first payment on account of fees to the architects on the signing of the th the builders. The sub-committee in he matter pointed out, however, that in premium (over and above the scale fees) that the contract is a large one, and y the architects had done a very large work. Under these circumstances it mended that the architects be paid count. The report went on to state one firm out of the selected list of d intimated that it was not prepared a tender, and that the quantities, s, and detail drawings had been sent emainder of the firms. The report and ation were adopted.

INK PHOTO SYRACUSE & C° L^TD 4 & 5 EAST HARDING STREET FETTER LANE E C

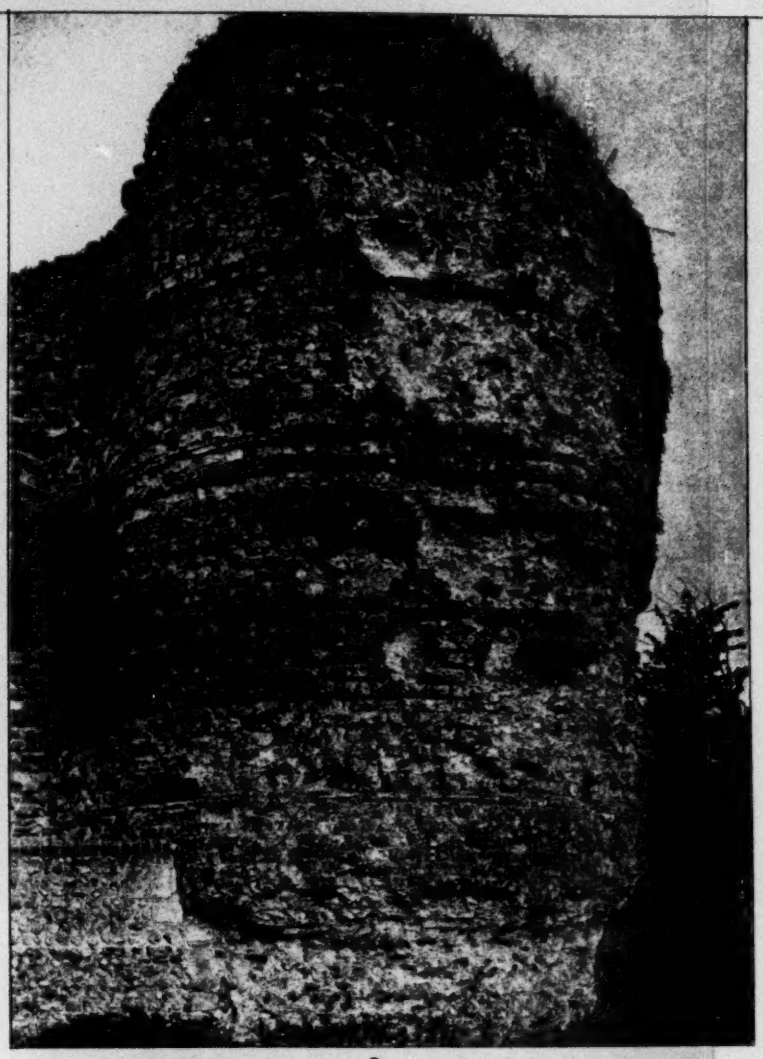
DECORATIVE PAINTING: "FLORA'S BOWER"—By Mr. Robert Christie

1.

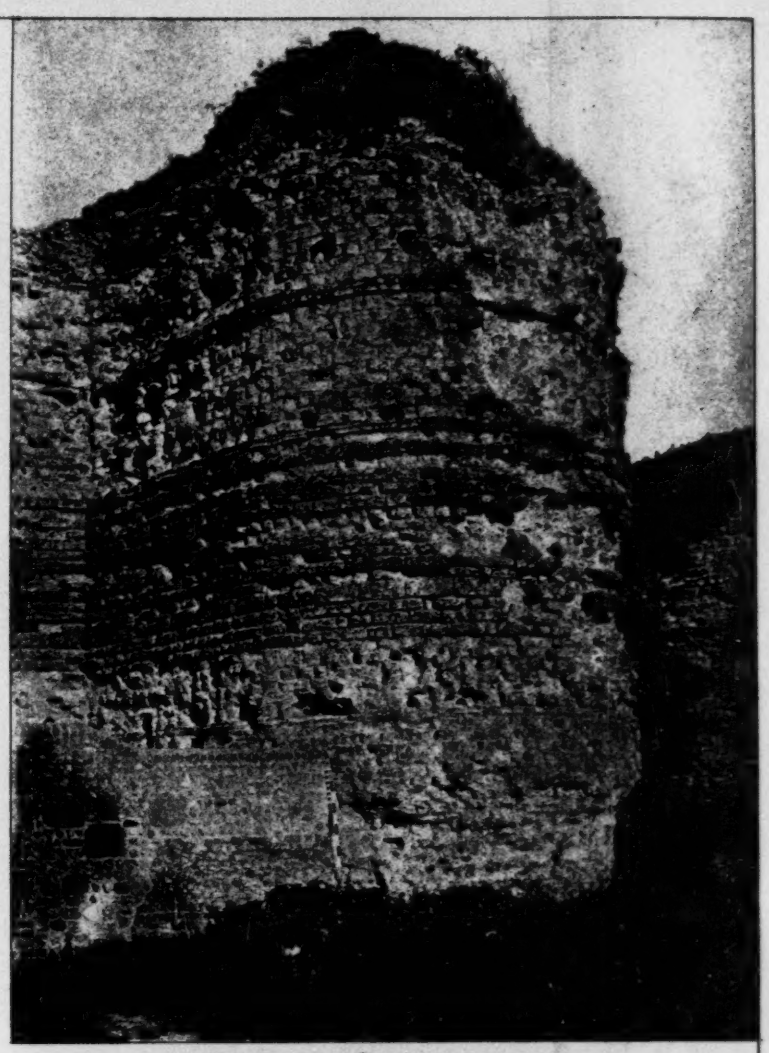


4.

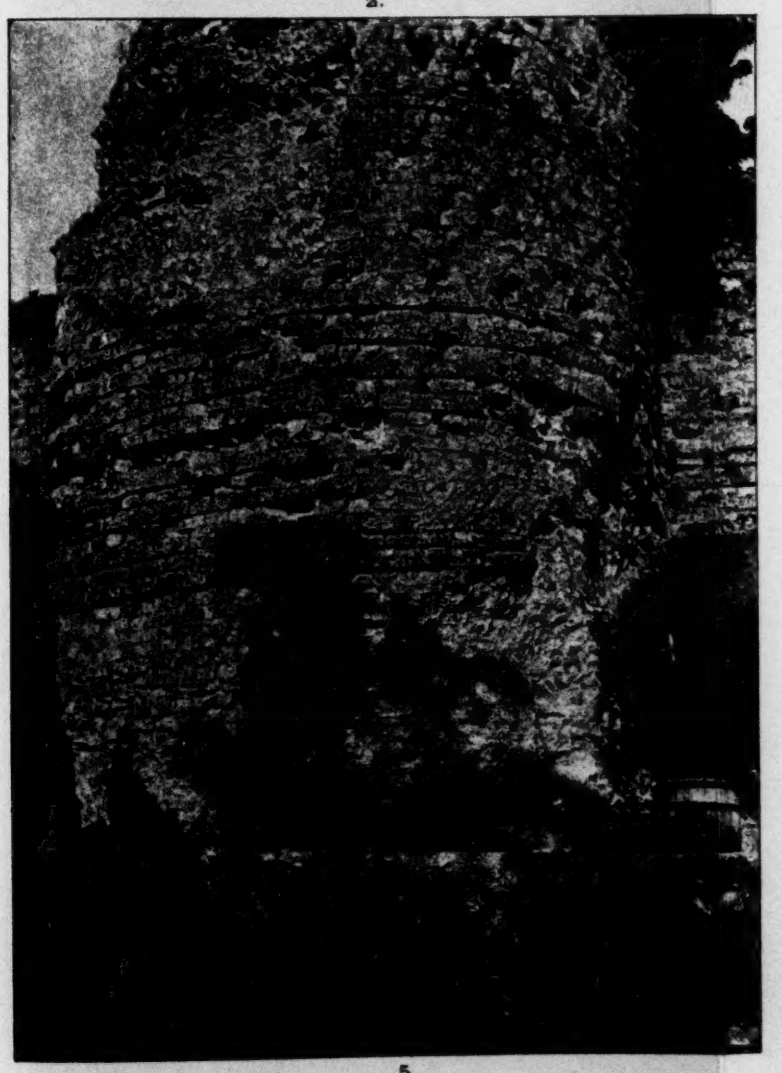
ROMAN MASON



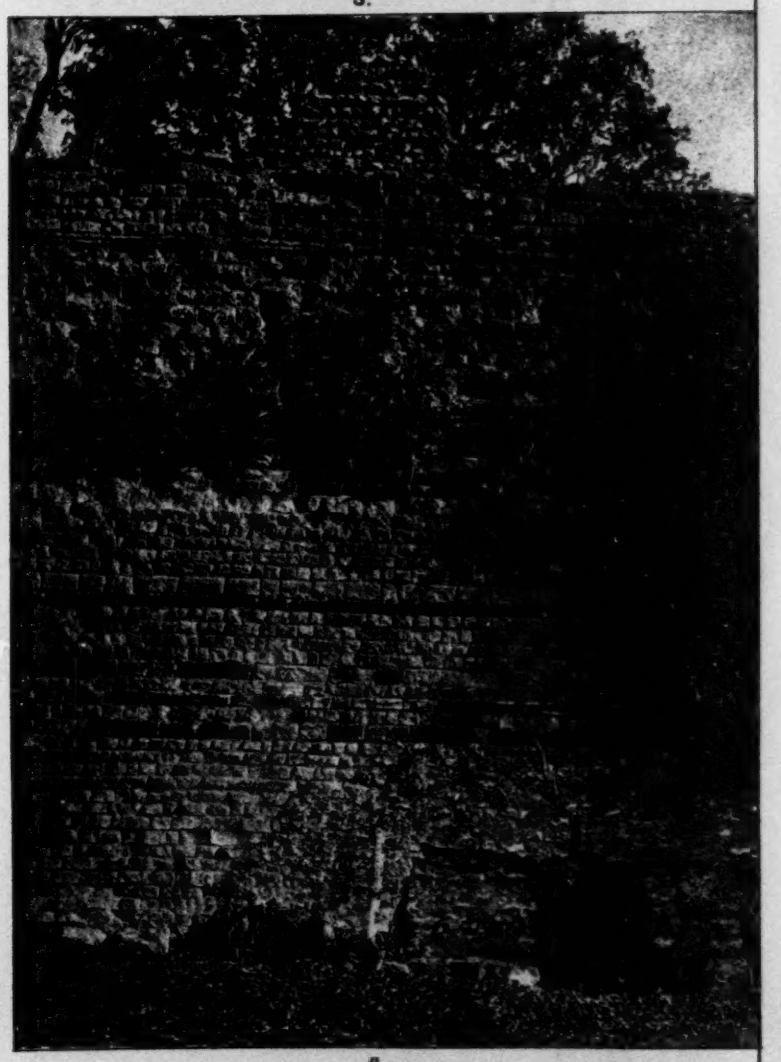
2.



3.



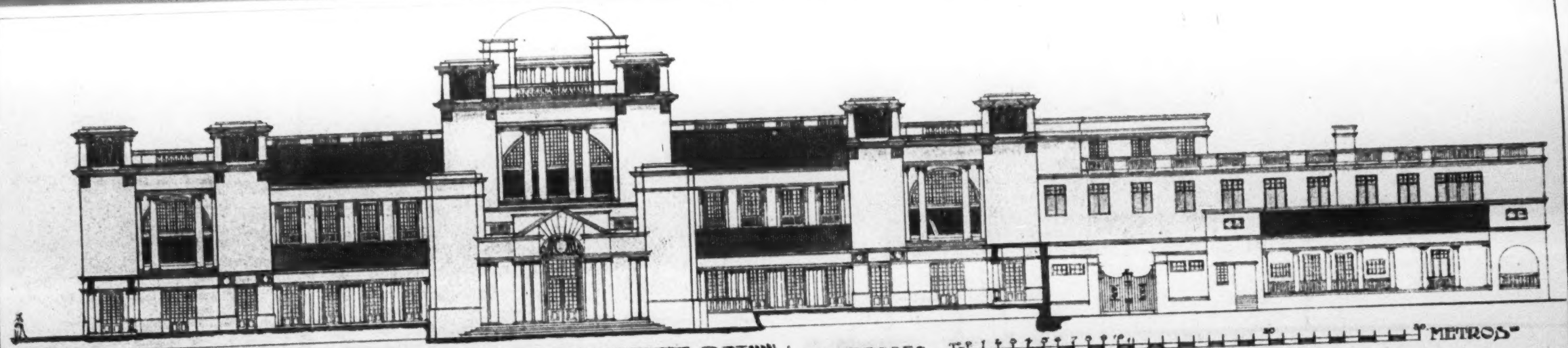
5



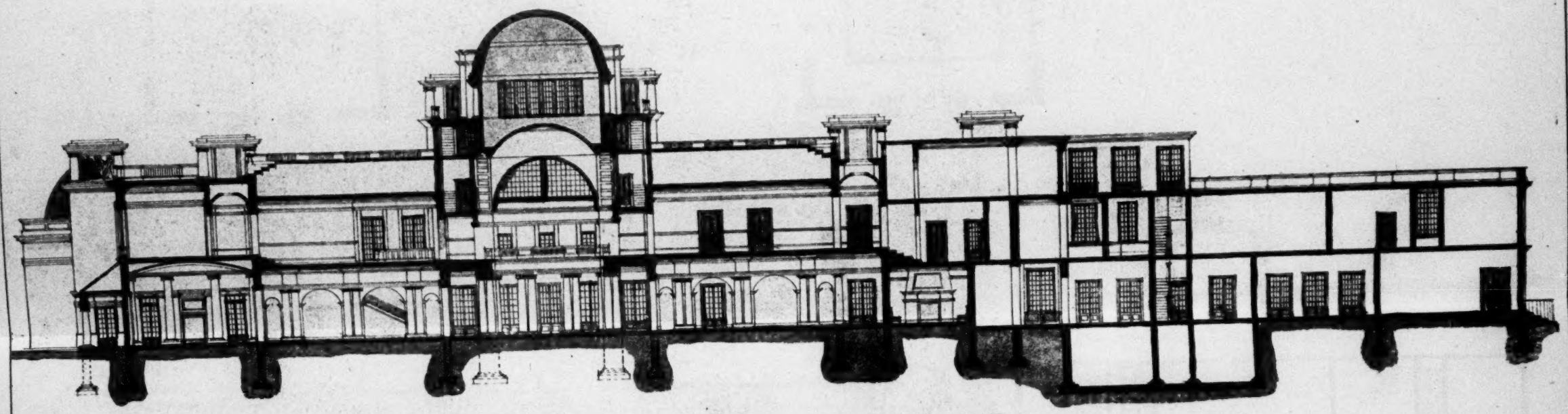
6.

"INK-PHOTO" SPRAGUE & C° LT° 4 & 5 EAST HARDING STREET, FETTER LANE, E.C.

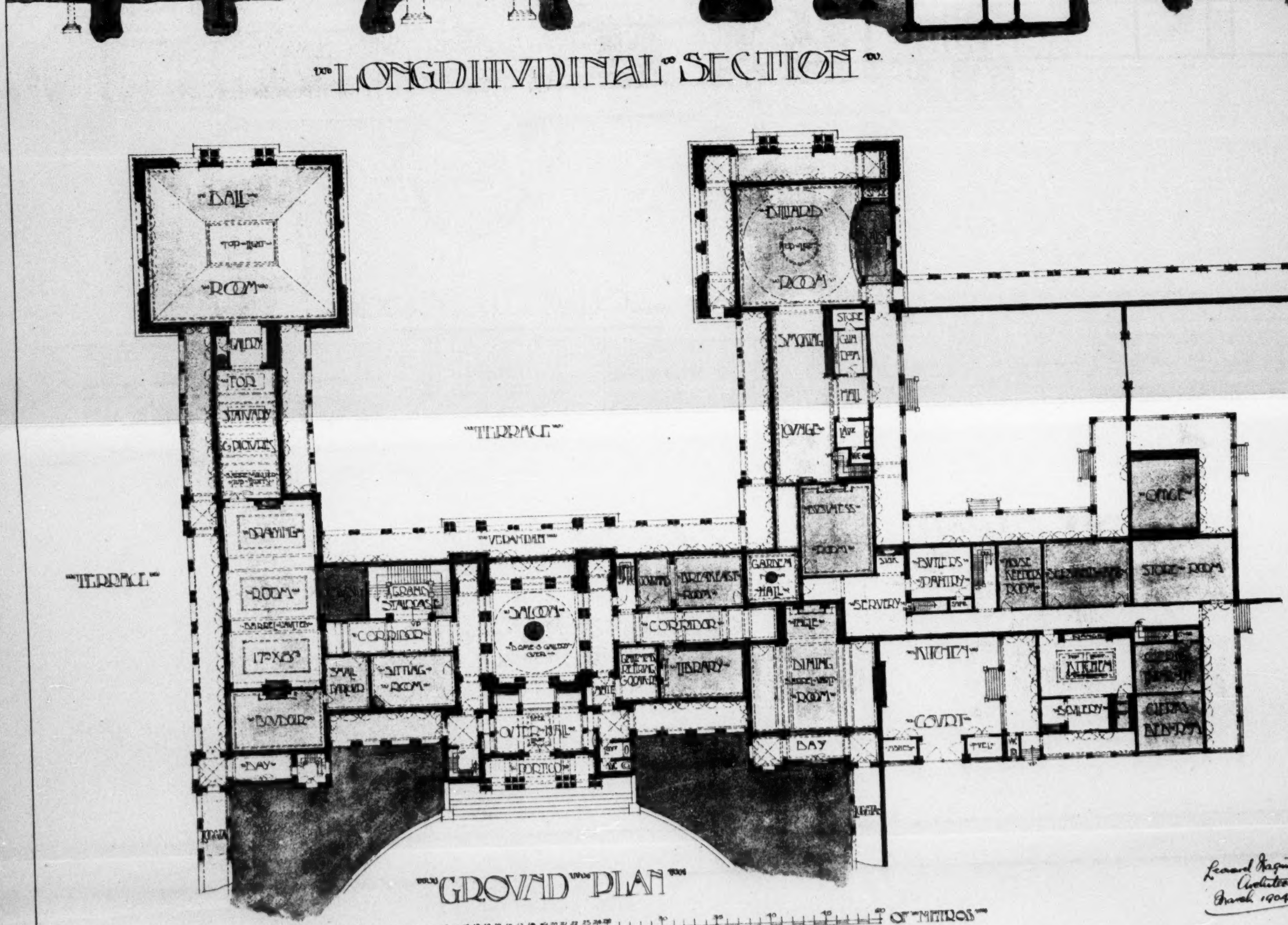
ROMAN MASONRY AT PEVENSEY



"FRONT" ELEVATION" "SCALE" OF" 1" METROS"



"LONGDITVDINAL" SECTION"

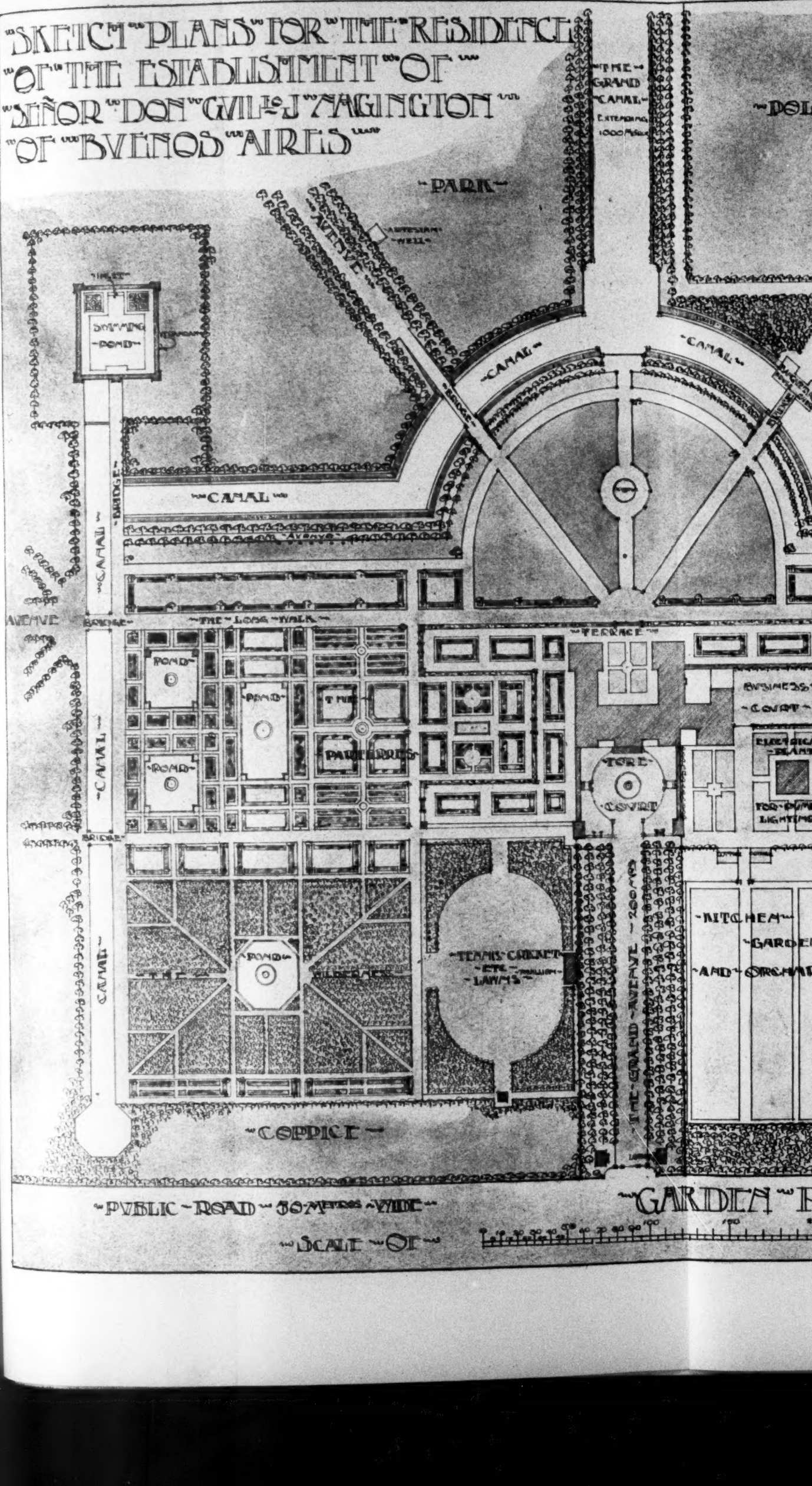


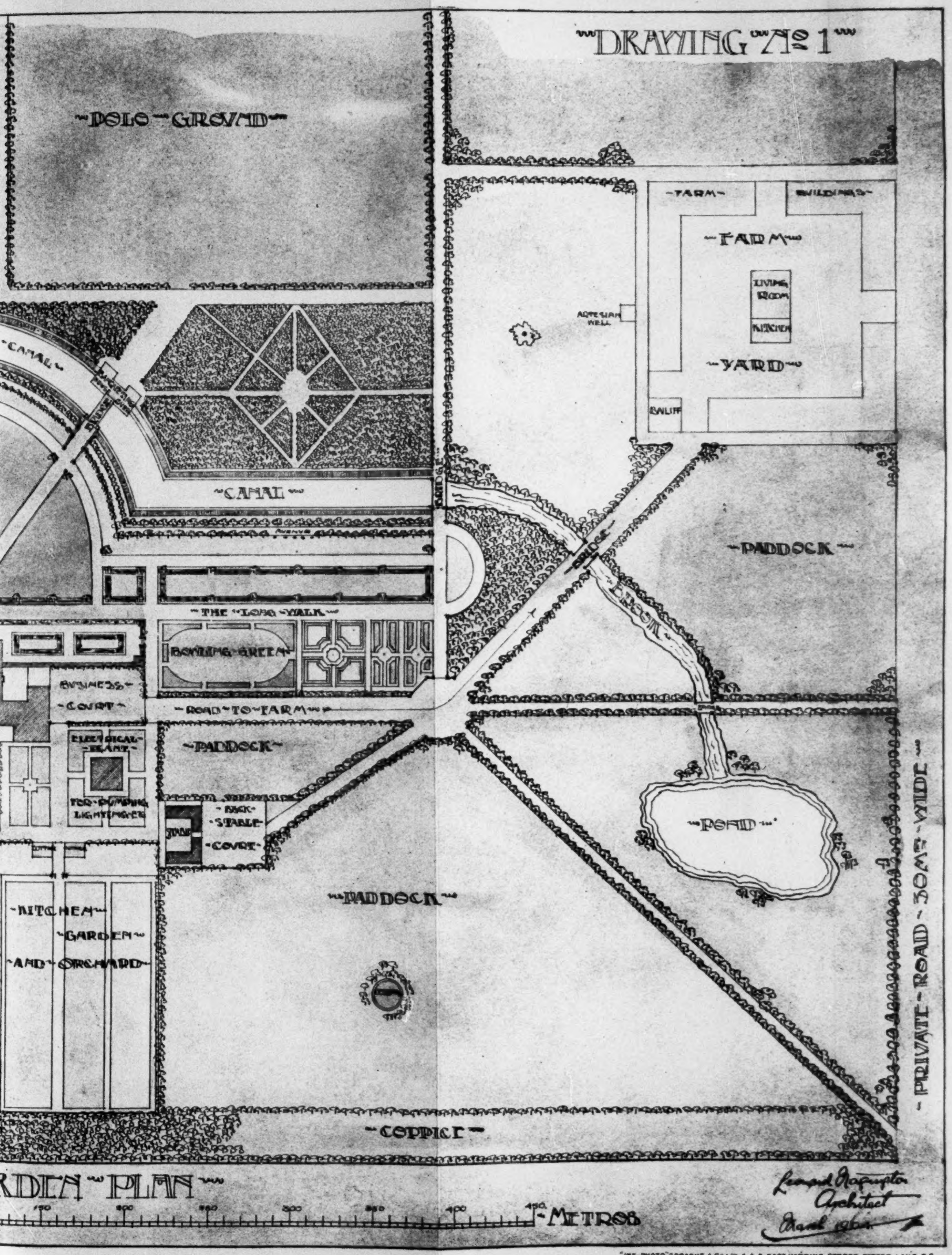
Leonard Nagington. Architect. March 1904.

INK PHOTO SPRAGUE & Co. Ltd 4 & 5 EAST HARDING STREET FETTER LANE, E.C.

SKETCH PLANS FOR RESIDENCE AT BUENOS AIRES.—Mr. Leonard Nagington, Architect.

SKETCH PLANS FOR THE RESIDENCE OF THE ESTABLISHMENT OF SEÑOR DON GVILLO J MAGINGTON OF BVENOS AIRES





"INK-PHOTO," SPRAGUE & CO., 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

A

THE SURVEYORS' INSTITUTION:
VALUATIONS FOR MORTGAGE.

AN ordinary general meeting of the Surveyors' Institution was held on Monday, at No. 12, Great George-street, Westminster, S.W., when Mr. J. J. Done read a paper on "Valuations for Mortgage." He said that the subject entered largely into the work of a surveyor, and he was inclined to think that more valuations were made for the purpose of mortgage than for any other, and the enormous building development of large towns would probably soon come to an end without the facilities for borrowing that were offered by banks, corporation trustees, and private individuals. But, irrespective of building development, the thousand and one exigencies of our complex business life require a never-ending stream of advances of money, which could be raised most easily, most cheaply, and most securely, by permanent or temporary mortgages. Looking back at the last twenty-five years his experience had been that, on the whole, money placed out on mortgage had paid its owners as well, and had been as secure and as easy to get in when required, as any security that could be named. When the enormous amount advanced on mortgage was considered, and when the remunerative rate of interest was taken into account, the occasional losses were negligible, and left a wide margin to the credit of mortgagees, and justified the returning popularity of this form of security. The author then dealt at length with the question of the valuation of the surveyor, and said that where a valuer was directly employed by the lender (which he might be, although paid by the borrower, and even in the first place instructed by the borrower) he must use reasonable care and skill, and, above all, act with a single eye to the interest of the lender; but that, when his valuation was prepared without reference to any particular lender, and was used without his being brought into communication with the lender, it was necessary to prove actual fraud, as defined in Derry *v.* Peek. He had stated that the valuer must act in the interest of the lender only. He had in his mind cases where valuers had been held liable for their valuations in which it had been shown that the valuer employed was so employed by the borrower, acted in the interest of the borrower, and apparently regarded himself as the agent of the borrower. Probably nothing so warped and distorted a man's judgment as this pernicious practice of trying to serve two masters, and more than one valuer had had to pay dearly for it. Having thus dealt with the responsibility which a valuer had to face before he entered upon a valuation for a mortgage, the author considered the general principles that apply to valuations made for mortgage purposes. He asked to what extent, if at all, did the principles of valuing for a mortgage differ from any other valuation? It was obvious, in the first place, that the position of a mortgagee differed from that of a purchaser. The latter took the property for better or worse, but a mortgagee had no benefit from any increase in the value after lending his money; but, on the other hand, if the security greatly depreciated, he might be unable to realise even what he had lent. Everyone who bought and sold knew that from unforeseen causes, or defect of judgment, some things did better than others, and, in the general run of buying and selling, the unexpectedly good might be set off against the unexpectedly bad. That was an average that a mortgagee could not strike. He had no "unexpectedly good," but he might have an "unexpectedly bad." Again, a purchaser could nurse or improve the property, attend to its proper management, and exercise in many ways a fostering care; but a mortgagee could not interfere with the management (except as afterwards mentioned) short of giving a notice to pay off, and, in the worst event, taking the property into his own hands. Even when he had done that he remained a mortgagee only, until such time as he had acquired a possessory title, and might be ousted at any time by the owner of the equity if the latter demanded the property and was ready to pay up all interest and other proper expenses which the mortgagee had incurred. It might, therefore, be some long time before a mortgagee had that security of tenure which was the essence of proper and thrifty management. He had, however, certain rights which went far to protect him. The author then quoted from Fisher's "Law of Mortgage," fifth edition, in order to define the position of the mortgagee. Proceeding, he said that when he came to realise, a mortgagee had not only to consider his principal money, but there were probably accumulations of interest, and there were the expenses of sale and conveyance and other legal expenses; and it was well to bear in mind that, as a very general rule, when a mortgagor got into difficulties, he had bled the property for all it was worth before the crisis came. Ought the valuer to take these circumstances into account? He submitted not. With great deference, he submitted that the valuer was called upon to value the property as it stood. As to the valuation he said he took it that, when they made their valuations, they had first of all to consider, in Vice-Chancellor Bacon's words, what would a prudent man do in his own case? Looking at the property, whatever it might be, with the eye of an expert, seeing advantages and defects which the ordinary buyer would not consider, they had to ask themselves whether the property was a readily marketable one, whether the market was likely to improve or the reverse, whether its intrinsic merits were of such a nature that, even if the market went against it, patience and care would enable it to recover itself, or whether it was of such a nature that to become derelict meant irretrievable ruin. In short, they had to look at every side, weigh contingencies and probabilities, giving to each its due proportion and perspective, and exercising the best judgment they could; remembering that in other things than war it was the unexpected that always happened. A valuer who could prepare the designs, write out the specification, and take out the quantities for a house, and who was constantly verifying his values by buying and selling, was obviously at an advantage as compared with one whose only knowledge of house property consisted in buying and selling. There were many details of construction, which the one would know how to appreciate or depreciate, but which by the other might be passed over. The author then dealt with the settlement of the rent of land, and said that rent, or rather revenue, was no doubt, in the case of land, the main factor on which to build a calculation, but in the case of London warehouse property, if that were taken without qualification it would sometimes lead to rather incongruous results. In the case of many City properties the ground rents were so high as to be practically a mortgage in themselves. These properties should be treated with caution. To say the least of it, they were not trustees' securities. An enormous amount of money was advanced every year on suburban house property. It was not perhaps wise to hazard such a generalisation, but he strongly suspected that the majority, perhaps the large majority, of suburban houses had a mortgage on them. Rent must not always be regarded as an entirely reliable basis. They all knew the builder, who, in order to get as much on mortgage as he could, put a higher rent in his tenant's agreement than he actually received. Houses beyond the limits of the suburbs were not so easy to deal with. There, any estimate of first cost was liable to be a fallacious guide to value. It was easy to spend a thousand pounds, or any other sum, on a house in some pleasant country place; but what the value would be when it was built was a widely different question. Isolated properties of this kind, even when accessible to a man engaged in business in some not far distant town, were liable to great vicissitudes. They would sometimes stand empty for months, or even years, and, generally speaking, a tenant had to be attracted by a low rent. Many a house that cost 2,000*l.* to build was worth in the market one-half that sum when finished.

The author dealt with several other securities, and referred, also, to one or two legal decisions.

THE CARPENTERS' COMPANY'S SCHOOL AT STRATFORD.—After an existence of eighteen years, the Stratford Institute, managed and supported by the Carpenters' Company, is about to be closed. The decision of the Court of Assistants to close the school is the sequel to the Education Act, which requires local authorities to provide secondary education.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday, in the County Hall, Spring-gardens, S.W., Sir E. A. Cornwall, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee, it was agreed to lend Finsbury Borough Council 1,412*l.* for paving works; Hackney Borough Council 1,200*l.* for electric light installation; the Royal Borough of Kensington 16,250*l.* for dust destructor and mortuary; and Stoke Newington Borough Council 16,925*l.* for electric light installation.

New Bills.—The Council approved of the following Bills being introduced in the next session of Parliament:—London County Buildings Bill, London County Council (General Powers) Bill, and the London County Council (Tramways and Improvements) Bill.

County Hall.—The Parliamentary Committee submitted a report dealing with the London County Buildings Bill, which is to empower the Council to acquire lands for the purpose of building thereon new offices, and also of constructing an embankment wall and embankment on the foreshore of the river, the object being to reclaim the foreshore for this purpose.

It was agreed to proceed with the Bill.

Suggested Museum.—In regard to the General Powers Bill,

Sir Melville Beachcroft moved, and Mr. Hunt seconded, that that portion of the Bill which enables the Council to provide and maintain buildings for the accommodation, exhibition, and presentation of works of art and objects of historical, antiquarian, or other public interest, should be omitted.

The amendment was defeated.

Electricity in Bulk.—The report of the joint committee of the Parliamentary and Highways Committee, and also of the Finance Committee, on the proposal to introduce a Bill in the coming session for power to supply electricity in bulk, both within and without the county, was then discussed at length.

Lord Welby, speaking as the chairman of the Finance Committee, said he felt that he had no alternative but to vote against the proposal, because of the conviction he had as to the financial lines the Council ought to follow. He was jealous of the credit of the Council, and he could only come to one conclusion, and that was that the Council was in danger of overstraining its credit. The commitments of the Council had been growing very largely lately, and in the improvements in Westminster and Holborn to the Strand no less a sum than 9,000,000*l.* was involved. It was true that within a certain time the recoupment of this improvement would cover the interest on the money, but at the present time, and for some years to come, the burden rested upon the ratepayers, and the same remark applied to the Council's other undertakings, such as the tramways, Rotherhithe tunnel, the County Hall, and, perhaps, also the Port of London. In addition to that, the figures before the Finance Committee pointed to a serious rise in the education rate.

Mr. W. W. Bruce said, in view of the fact that within the next two or three years the Council would have to raise some 20,000,000*l.* by way of loan, there should be no doubt as to the financial advantages of the scheme. He, therefore, thought it would be better to leave the bulk supply of electricity in the hands of the authorised undertakers.

Mr. Allan Baker contended that, considering the need of London in the matter of the supply of electricity, it was incumbent that the London County Council should come in and undertake the duty.

After further discussion, the recommendation of the joint committee to proceed with the Bill was carried on a division by sixty-six votes to thirty-eight.

Common Lodging-houses — Precautionary Measures Against Fire.—The Public Health Committee reported as follows:—

"Having regard to the recent occurrence of a fire at a common lodging-house in Glasgow, resulting in serious loss of life, we think the Council will desire to be informed of the measures which have been taken with a view to minimising the risk of such a fatality at any of the common lodging-houses in the county of London. In the administration of the law relating to common lodging-houses in London we were impressed some years ago by the danger to the lodgers in the event of a fire breaking out at some of the premises, and this was one of the considerations which led us to recommend the Council to apply to

Parliament for authority to require that no house should be used as a common lodging-house unless the keeper obtained annually a licence from the Council for that purpose. . . .

By the London County Council (General Powers) Act, 1902 (Part IX.), the Council obtained the legislation necessary for the purpose. Sect. 47 of that Act provides that the Council shall "make or cause to be made all necessary and proper inspections and inquiries . . . as to whether the premises in respect of which application is made for a licence are structurally and otherwise suitable for use and occupation as a common lodging-house, having regard to the number, health, safety, and convenience of persons occupying or intending to occupy the same," and sect. 50 of the Act provides that one of the grounds upon which the granting or renewal of a licence may be refused is "that the premises are not suitable or suitably equipped for the purposes of a common lodging-house." The Council delegated to us the exercise of the licensing powers conferred upon it by the Act, and we have, during the last three years, dealt with all the common lodging-houses in London as regards the means of escape in case of fire, and the works which the Council has considered necessary have in nearly all cases now been completed. In the preparation of these requirements the architect and the chief officer of the London Fire Brigade have made inspections of the houses and have advised us thereon. There are at the present time 281 houses accommodating 24,511 men, forty-four accommodating 2,303 women, and thirteen houses with accommodation for 310 married couples.

It has not been easy in dealing with houses of the class in question to devise means of escape which, while reasonably sufficient for the purpose, could be carried out without involving prohibitive expense. We have given every consideration to any alternative proposals or suggestions made by the keepers of the houses, and we recognise with satisfaction the efforts which the great majority of the keepers have made to carry out the required works. Our general practice has been to insist upon an alternative means of escape in case of fire being provided from rooms licensed for lodgers, and this has necessitated the construction of new staircases in a number of the larger houses and of external balconies and step ladders in others. In several instances it has been possible to obtain the alternative means of escape by making openings between adjoining houses. In cases in which the provision of means of escape by the roof has been allowed we have required guardrails to be fixed. Other requirements have had relation to the protection of staircases, when necessary, the rehanging of exit doors so as to open by pressure from the inside, the removal of inflammable material stored in dangerous positions, notices as to the positions of exits and nearest fire-alarms, the provision of fire-extinguishing appliances, and the lighting throughout the night of means of exit. In dealing with houses accommodating women we have especially felt it necessary to secure that the alternative means of escape shall be readily accessible, and such as women would have no difficulty in using.

We shall, of course, take steps to ensure that the means of escape and the fire-extinguishing appliances provided at the houses shall be kept in good condition and efficient working order, and a by-law which requires this is included in the series recently made by the Council."

Basements in the Strand.—The Establishment Committee recommended, and it was agreed:—

"(*a*) That an agreement be entered into under which the Council will retain the portions not subleased of the basements of the shops at Nos. 56-59, Strand; that the agreement do provide that the Council shall do the necessary works for separating the two portions of the basements, and shall repay to the owner the cost when ascertained, of the work of reinstating the basements at the end of the term; that the solicitor do complete the matter; and that the seal of the Council be affixed to the necessary documents when ready.

(*b*) That expenditure not exceeding 110*l.* be authorised for the necessary work of adaptation, and the provision of electric lighting in the portion of the basements retained by the Council at Nos. 56-59, Strand."

Tramways.—The following recommendations were agreed to:—

"That the estimate of expenditure on capital account of 32,000*l.*, submitted by the Finance Committee, be approved in respect of the roadwork and platelaying (including rails) for the reconstruction of the existing tramways in Vauxhall Bridge-road, and the construction of tramways over the new Vauxhall Bridge, for the underground conduit system of electrical traction.

That expenditure, on capital account, not exceeding 5,300*l.*, be sanctioned for the provision of track and slot rails, etc., for the reconstruction of the tramways in Vauxhall Bridge-road, and the construction of tramways over the new Vauxhall Bridge, for the underground conduit system of electrical traction.

That the offer of J. Mowlem & Co., Ltd., to execute, for the sum of 4,995*l.*, the roadwork and platelaying in connexion with the construction of tramways over the new Vauxhall Bridge for the underground conduit system of electrical traction, be accepted.

That the estimate of expenditure on capital account of 112,000*l.*, submitted by the Finance Committee, be approved in respect of the erection of the car-sheds and sub-stations required for the electric working of the first section (equivalent to about twenty-two and a half miles of single line) of the Council's (Northern) Tramways, including expenditure incidental thereto.

That the estimate of expenditure on capital account of 12,000*l.*, submitted by the Finance Committee, be approved, in addition to the estimate of 14,000*l.* approved on July 5, 1904, in respect of the reconstruction of bridges necessary in connexion with the reconstruction of the first section of the Council's (Northern) Tramways for the underground conduit system of electric traction.

That the estimate of expenditure on capital account of 665,600*l.*, submitted by the Finance Committee, be approved in respect of the reconstruction and equipment of the first section (equivalent to about twenty-two and a half miles of single line) of the Council's (Northern) Tramways for the underground conduit system of electric traction, namely—

Trackwork, including rails, etc.	£415,600
Rolling-stock, cables, cable-ducts, machinery, plant, and other equipment	250,000
	£665,600

That the estimate of expenditure on capital account of 21,000*l.*, submitted by the Finance Committee, be approved in respect of the acquisition of a site at Holloway for the erection of tramways buildings required for the electric working of portions of the Council's (Northern) Tramways.

That the freehold interest of the Tufnel and Caledonian Park Syndicate in the property in Pemberton-road and Pemberton-terrace, Holloway, known as the Caledonian football ground . . . be acquired for the sum of 20,000*l.*, subject to the condition that the main wall of the buildings on the northern boundary shall not be erected at less than 15 ft. from the boundary wall in the rear of St. John's-park-mansions. . . .

That the resolutions of the Council of October 31, 1905 (i.), approving expenditure of 23,930*l.* for the erection of sub-stations for the first section of the Council's (Northern) Tramways, and also the manner in which the work shall be carried out, and (ii.) accepting the tender of 31,131*l.* 15*s.* of Messrs. Bolckow, Vaughan, & Co., Ltd., for the supply of track rails, etc., for the same lines, and allowing the sub-letting of certain portions of the work, be rescinded.

That expenditure on capital account of sums not exceeding 23,930*l.* in all be sanctioned in respect of (1) the erection of the Mildmay-park, Limehouse, and Shoreditch sub-stations of the London County Council (Northern) Tramways; (2) the wiring and fitting of the buildings for electric lighting, etc.; and (3) the execution of the paving works in connexion with the Mildmay-park and Limehouse sub-stations.

That the erection of the Mildmay-park, Limehouse, and Shoreditch sub-stations be executed without the intervention of a contractor, and that the drawings and specifications and estimates of 6,700*l.*, 6,800*l.*, and 6,900*l.*, respectively, be referred to the Works Committee for that purpose.

That the paving works, etc., in connexion with the Mildmay-park and Limehouse sub-stations be executed by the Council's permanent way staff under the supervision of the chief officer of tramways.

That the wiring and fitting for electric lighting, etc., of the Mildmay-park, Limehouse, and Shoreditch sub-stations be executed by the electrical staff of the tramways department under the supervision of the chief officer of tramways.

That expenditure, on capital account, not exceeding 31,131*l.* 15*s.*, be sanctioned in connexion with the supply of track rails and fastenings for the reconstruction of the first section of the Council's (Northern) Tramways.

That, subject to the result of the usual inquiries proving satisfactory, the tender, amounting to 31,131*l.* 15*s.*, of Messrs. Bolckow, Vaughan, & Co., Ltd., for the supply of track rails and fastenings in connexion with the reconstruction of the first section of the Council's (Northern) Tramways, be accepted."

New Theatre, Shaftesbury-avenue, Wardour-street, and Little Rupert-street.—The Theatres and Music Halls Committee reported that they had considered plans submitted by Mr. W. G. R. Sprague, on behalf of Mr. Seymour Hicks, showing the arrangements proposed to be adopted in the construction of a new theatre in Shaftesbury-avenue, with frontages to Wardour-street and Little Rupert-street. The applicant has agreed to surrender the land required for the widening of Wardour-street to 40 ft. at the part in question, and as a result the site will comply with the regulations of the Council. Accommodation is shown for an audience of 1,172 persons seated and 130 standing. The application was agreed to on certain conditions.

The Council adjourned at 8.30 p.m.

APPLICATIONS UNDER THE 1894 BUILDING ACT.

THE London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Lines of Frontage and Projections.

Hampstead.—That the application of Mr. V. H. King for Mr. F. E. F. Barham, for an extension of the period within which the erection of a bay-window at No. 3, Wedderburn-road, Hampstead, was required to be commenced be granted.—Consent.

Lewisham.—Buildings on the northern side of Codrington-hill, Brockley (Mr. J. W. Webb).—Consent.

Poplar.—An addition at the rear of St. Paul's Presbyterian Church, West Ferry-road, Millwall (Mr. T. P. Figgis for the Committee of the Church).—Consent.

Westminster.—Enclosures to the sides of a porch at the Royal Horticultural Hall, Vincent-square, Westminster (Mr. E. J. Stubbs for the Royal Horticultural Society).—Consent.

City of London.—A projecting carved wooden hood over the entrance to an addition to the hall of the Company of Tallow Chandlers, Cloak-lane, City (Messrs. J. D. Mathews & Son for the Company of Tallow Chandlers).—Consent.

Hampstead.—The retention of a shop front erected under the projecting landing at No. 150, Finchley-road, Hampstead (Messrs. C. Saunders & Son, Ltd.).—Consent.

Peckham.—Retention of an iron and glass roof in front of Nos. 24 and 26, High-street, Peckham (Messrs. G. F. Morgan & Co.).—Consent.

Strand.†—Two glass and iron shelters at the Aldwych Theatre, to abut upon Aldwych and Drury-lane, Strand (Mr. W. G. R. Sprague for the Hicks Theatre Syndicate, Ltd.).—Consent.

Peckham.—An open glass roof in front of a greenhouse adjoining No. 79, Queen's-road, Peckham (Mr. A. Madgett).—Refused.

Kensington, South.—A studio at the rear of No. 70, Addison-road, Kensington, to abut upon Addison-crescent (Mr. A. Poynter for Sir E. J. Poynter, Bart., P.R.A.).—Refused.

Marylebone, East.—A request of Mr. T. Stevens, on behalf of "Argyll's London Limited," for permission to retain two projecting signs at No. 17, Newman-street, Oxford-street, St. Marylebone.—Refused.

Wandsworth.—Five houses on a site abutting upon the north-western side of Church-lane and eastern side of Moring-road, Tooting (Messrs. Nash & Lillywhite).—Consent.

Width of Way.

City of London.—Buildings on the site of Nos. 1 to 6, Lombard-street and the Gresham Club, St. Swithin's-lane, City, with external walls at less than the prescribed distance from the centres of the roadways of St. Swithin's-lane and George-street (Messrs. Dunn & Watson for the Scottish Provident Institution-buildings, Ltd.).—Consent.

Paddington, South.—A one-story bay-window addition at the rear of No. 28, St. Petersburg-place, Paddington, with external walls and boundary fence at less than the prescribed distance from the centre of the roadway of St. Petersburg-mews (Mr. T. H. Smith for Mr. F. Lenders).—Consent.

Greenwich.—Retention of one-story buildings on the north side of River Bank, Anchor and Hope-lane, Charlton, with external walls at less than the prescribed distance from the centre of the roadway of River Bank (Mr. J. Rowland for Messrs. Flower & Everett).—Consent.

Hammersmith.—A request of Messrs. Coburn & Co. for Mr. E. J. Harbott, for permission to retain for a further period a boundary fence on the northern side of a footway leading from Bridge-avenue to Mall-road, Hammersmith.—Refused.

Width of Way and Line of Frontage.

St. George, Hanover-square.—Buildings on the site of Nos. 321 and 323, Oxford-street, to abut also upon Dering-street (Messrs. Gordon & Gunton for Messrs. Hitchings, Ltd.).—Refused.

Width of Way and Space at Rear.

Bermondsey.—Buildings on a site on the northern side of Snowsfields and the eastern side of Weston-street, Bermondsey (Messrs. Rings & Myers for Mr. E. B. Kapp).—Consent.

Formation of Streets.

Walworth.—That an order be issued to Messrs. Cluttons sanctioning the formation or laying out of a new street for carriage traffic to lead from Merrow-street to Shaftesbury-street, Walworth (for the Ecclesiastical Commissioners).—Consent.

Hammersmith.—That an order be issued to Mr. F. W. Tarring refusing to sanction the formation or laying-out of streets for carriage traffic out of the north side of Uxbridge-road, Hammersmith, eastward of St. Luke's Church (for the Trustees of the McQueen Trust Estate).—Refused.

Space at Rear.

Kensington, South.—A modification of the provisions of Part V. of the Act, so far as relates to the erection of Nos. 189 to 214, inclusive (blocks 7 and 8), and Nos. 215 to 240, inclusive (blocks 8 and 9), Oakwood-court, Kensington (Messrs. Rolfe & Matthews for Messrs. Jones Brothers).—Consent.

Paddington, South.—A modification of the provisions of section 41 with regard to open spaces about buildings, so far as relates to the proposed erection of residential flats to abut upon Seymour-street, Edgware-road and Connaught-mews, Paddington, with irregular open spaces at the rear (Mr. D. Brown for Lady E. R. Hope).—Consent.

Means of Escape.

Kensington, South.—Means of escape in case of fire proposed to be provided in pursuance of section 63 of the Act on the seventh (top), sixth, and fifth stories, and the fourth floor mezzanine of a building to be known as "Thorney Court" (Kensington-road block), Kensington (Messrs. Millard & Pryce).—Consent.

Sealing.

Lewisham.—That the seal of the Council be affixed to a duplicate of the deed of covenant in connexion with the application of Mr. H. L. Upham, on behalf of Mr. C. Walker, under Part V. of the Act, in respect of a building on the south side of Dunoon-road, Forest-hill.—Agreed.

Erection of Projecting One-story Shops at Nos. 431 to 451 (odd numbers only), Edgware-road.

Paddington, North.†—One-story shops in front of Nos. 431 and 433, Edgware-road, Paddington (Messrs. Gardiner & Theobald for Messrs. Matthews & Sons, Ltd.).—Refused.

Paddington, North.†—One-story shops in front of Nos. 435 and 437, Edgware-road, Paddington (Messrs. Gardiner & Theobald for Meux's Brewery Company, Ltd.).—Refused.

Paddington, North.†—One-story shops in front of Nos. 439 to 451 (odd numbers only), Edgware-road, Paddington, to abut also upon Maida-hill West (Messrs. Boehmer & Gibbs for Mr. W. Hirsch).—Refused.

The recommendations marked † are contrary to the views of the local authority.

THE ARCHITECTURAL ASSOCIATION DISCUSSION SECTION.

THE fourth meeting of the session was held at No. 18, Tufton-street, S.W., on Wednesday, December 6, Mr. E. W. M. Wonnacott being in the chair, when Mr. W. A. Forsyth read a paper on "The Conversion of the Jerry-Builder," of which the following is an abstract:—

The lecturer first pointed out that the flood of small suburban property, laid out on the most chaotic lines, arises from the present travelling facilities, combined with the rebuilding of congested urban areas, and the home sentiment of the middle-class Englishman.

The term jerry-builder may be defined as the builder of unsubstantial or temporary structures. He himself may emphatically declare another claim, however, that of permanence; but atmospheric nature finds him cheating, and here our real quarrel begins. His whole aim being, like that of many worthier people, to make money, he shapes his undertakings with that idea. First, therefore, the architect's place is taken by the auctioneer's clerk, who turns out any plans required by local authority. The proprietor of the land lays it out with no regard for open space or breathing room, and leads the way to the formation of unhealthy districts, where peace and quiet cannot be found.

Thus is the virgin soil of Nature violated for all time, and now surely some control is needed upon the efforts of those two ardent self-seekers.

Playful fancy appears in the naming of roads and houses. The "avenue" is barren of trees; "gardens" is but warranted by a few window-boxes; while the saplings lining the footway give an accepted meaning to "grove." The jerry-builder aims to build at the smallest cost, and then to let or sell rapidly. The house is the sufferer from his efforts to catch the eye of the tasteless. Here, the favourite resources consist of carved stone caps to the bay-window, the sashes of which chatter as no neighbour ever did; lintels shaped as arches, and thin deal strips commemorating the timber age of old. The importations from Sweden decide all internal detail, and the colours and papers, a choice quaintly conceded to the tenant, complete the inferno.

As the painter clears his pots from the house the grand lady glorifies this triumph of building by suspending new lace curtains in the windows, suggesting social tone to the neighbours, and toning down the excess of light in the room. Cause and effect are here mingled, but we must hold the builder responsible for such misdoings.

Time, weather, and the district steam-roller all play their part on the unseasoned materials, until we have the usual story to tell. It is remarkable that such uniformity in size should be found in the houses we are considering. No variation is made to meet the needs of large or small families, and no convenient extension is possible. It is astonishing how rapidly these houses let, and how the people imagine vain things, believing, very generally, that theirs is a well-built place. This, in spite of the nursery rhymes and music lessons which come gratis through the walls, or the picturesque appearance of the opposite sister house, accidently provided by the window glass.

Another curious fact is the wastefulness and hide-bound tradition practised by the jerry-builder. Rooms are too high and cut about in shape. The upper floor is never taken into the roof, windows are too large, and passages and stairs out of all proportion to the rooms. In fact, the jerry-builder is perverse, and persists in a well-used type of some forty years old, lest he should suffer financial ruin by diverging from it. Now, is it not possible to rescue the perpetrator of these deeds? Though heathen, he is, in a sense, a man of enterprise, and sometimes of common sense, and, if approached peacefully, will lend patient ear to the gospel of the architect. But the creed of the latter should be preached from the basis of econony, and the need of meeting the developed and advancing tastes of the public. Further, it should be shown that such a change does not necessarily mean increased cost.

Of methods other than this moral suasion comes first the control of the local authority. Estates should not be laid out at haphazard, but on a grouped and convenient lay-out. The provision of open spaces, sites for public buildings of the future, all should be considered. The enhanced surroundings will induce the builder to better things. At all events, and without wishing to raise any side issues, no plans should be considered by a local authority unless prepared by a qualified architect.

Our next step is to remove certain of the existing by-laws, and to add a few more clauses tending to the improvement of materials. The jerry-builder deals in cast-offs, and he should be led to put in timbers of a less sappy growth, and joinery of a more seasoned quality than the finished article just unshipped from the Baltic. This will all help to the health and peace of mind of the occupant, and the lasting and saleable value of his property.

The architect is our next agent. The want of expert knowledge deplored by Ruskin is surely dispelled now in these days of architectural education.

Now, let the architect hold out the olive branch to the jerry-builder (not forgetting his co-sinner, the land speculator), and show him the error of his ways.

The architect, being in touch with current ideas, will point out the wastefulness in certain aspects of the jerry-builder's design, and so educate him.

The illustrated press may also prove a great and useful agent in our missionary work.

Summarising these suggestions we have:—

Firstly—Authoritative control in the development of a district.

Secondly—By-laws framed to ensure durable and substantial work.

Thirdly—The attention of architects to small speculative work; and lastly, the judicious help of the Press.

In effect, therefore, we desire better building, and architecture will follow.

The Chairman then read a long and interesting leter from Mr. Voysey, contending that more control was not desirable, and advocating greater freedom from restrictive by-laws. Hope lay in architects doing their work more thoroughly and conscientiously.*

Mr. A. Taylor, in opening the discussion, thought that the jerry-builder was but the outcome of people's wishes and habits. Other speakers brought forward the evils of the leasing system, and the possibilities of co-operative living and housing.

Mr. Waldram pointed out that urban councils here were often not composed of the right kind of men. He mentioned a recent development in the north-west of small property, cleverly planned and laid out, and the influence this had had on later development in the district.

Mr. Max Clarke, after suggesting that the younger men should practice public speaking at these meetings, fell foul of the "flat" system. Like other speakers, he upheld the need for more, rather than less, power of control.

Mr. Ellis Marsland, summing up the discussion, was doubtful whether to bless or curse the jerry-builder, and began by blessing. Like the latest paper, he supplies a long-felt want. Faults he has certainly, but he is a creature of circumstances; the public, the ground landlord, and the mortgagor all control him. The public must be educated, then better work must come.

Mr. Forsyth's few remarks in reply referred to the good standard being set up by the London County Council buildings. Good building was the essential and first need.

The Chairman announced that the next paper would be on "The Houses of Parliament," for which the loan of many original drawings and studies had been secured.

* But what has that to do with the control of the jerry-builder?—ED.

ENGINEERING SOCIETIES.

SOCIETY OF ENGINEERS. — The fifty-first annual general meeting of the Society of Engineers was held on Monday, the 11th inst., at the offices of the Society, 17, Victoria-street, Westminster. The chair was occupied by Mr. Nicholas J. West, President. The following gentlemen were duly elected by ballot as the Council and officers for 1906, viz.:—As President—Mr. Maurice Wilson; as Vice-Presidents—Messrs. Richard St. George Moore, Joseph William Wilson, and William Henry Holttum; as ordinary members of Council—Messrs. John Aird, Joseph Bernays, Alexander Graham Drury, George Abraham Goodwin, George Green, Edward John Silcock, Diogo Andrew Symons, and Francis George Bloyd; as Honorary Secretary and Treasurer—Mr. David Butler Butler; as Honorary Auditor—Mr. Samuel Wood, F.C.A. The President announced that Lord Rayleigh, Chairman of the National Physical Laboratory, and Sir Alexander Binnie, President of the Institution of Civil Engineers, had been elected by the Council as honorary members of the Society, thus filling the vacancies created in the list of honorary members by the deaths of Sir Lowthian Bell and Mr. James Mansergh. The President announced that the following premiums had been awarded by the Council for papers read during the past session, viz.:—The President's gold medal to Mr. Sherard Cowper-Coles for his paper on "The Metallic Preservation and Ornamentation of Iron and Steel Surfaces"; the Bessemer premium of books to Mr. Ernest Romney Matthews for his paper on "The Parade Extension Works at Bridlington"; a Society's premium of books to Mr. Benjamin Laurenson Bradley for his paper on "The Grindleford Stone Quarries and their Working"; and a Society's premium of books to Mr. William Pollard Digby for his paper on "Statistics of British and American Rolling Stock."

BOOKS RECEIVED.

A MANUAL OF CARPENTRY AND JOINERY. By J. W. Riley. (Macmillan & Co. 6s.)

ECCLESIA ANTIQUA: The History of an Ancient Church (St. Michaels, Linlithgow). By the Rev. John Fergusson. (Oliver & Boyd.)

THE LONDON BUILDING ACTS: 1894 TO 1905. By Bernard Dicksee, F.R.I.B.A. Second Edition. (E. Stanford. 7s. 6d.)

Correspondence.

"STANDARDISING" BILLS OF QUANTITIES.

SIR,—The committee appointed some three years ago by the Council of Civil Engineers to consider the advisability of standardising various kinds or iron and steel sections, have recently published their report. The original scope of the inquiry was subsequently extended to embrace tests for materials, and, in fact, most of the appliances and matters occurring in the ordinary routine of a civil engineer's practice. The committee were supported by the kindred societies, and no one who has read their report, or had occasion to use its publications, can possibly fail to appreciate the success which has attended the inquiry. Possibly their standard specification for Portland cement is the best known of their publications to those connected with the building business.

If it is possible for one society to arrive at a satisfactory basis on points upon which there must have been a wide diversity of ideas and opinions, surely it should be possible for another?

I question if there is any other profession whose members run more on their own

individual lines or in grooves they have cut out for themselves than the present-day quantity surveyors. It is only necessary to take up two sets of quantities prepared by different surveyors to see how items occurring in almost every bill are differently treated or described.

Some time ago this was very much emphasised in a case which came under my notice, where two London surveyors, both of standing and repute, prepared the bills for identical blocks of buildings in a large scheme. Under such conditions one would naturally expect to be able readily to compare most of the principal items. The actual result, however, was that not half of the items could be compared without referring to different parts of the bills, and going through a series of addings and deductings.

To be able to arrive at some understanding and to lay down some uniform and standard system—as to the different stages at which excavations should be measured, the depths of trenches to which planking and strutting should be taken, whether glazed brick facings should be measured on the girth line, or an allowance made at internal angles; how the eaves of slating should be given, what preparatory labours on stonework should be measured, what extra labours should be given on ordinary sashes and frames, which drillings in steel constructional work should be given as done in position, besides the definition of the sterotyped clause of "attendance on all trades in all trades," of the meaning of the letters "P.C.," and too many items, clauses, and phrases always occurring in bills of quantities—ought, and should, be possible.

I have no intention of implying that all these matters are not generally treated in a careful and practicable way by surveyors, but my plea is for the adoption of some standard and recognised system readily understandable by all those into whose hands our work is placed.

To relegate each trade to a small committee composed of, say, five members, preferably with representatives from the Surveyors' Institution and the newly-formed, but apparently rather vigorous, Association of Quantity Surveyors, and for each committee to submit its report to a council composed of the whole of the gentlemen engaged on the committees, would form one way in which a solution of the matter might be accomplished.

Perhaps, sir, if you can find space to insert this letter it may be the means of eliciting the views of others on a subject which appears to me to be worthy the consideration of the profession. HENRY RILEY.

"PAINTERS' ARCHITECTURE."

SIR,—In your friendly notice of my recent articles in the *Art Journal*, you accuse me of two misdeeds—an error of observation, and the use of a non-existent word. I must plead guilty on both counts. The temple in the background of Raphael's "Marriage of the Virgin" is, as you point out, a polygon of sixteen sides, not of twelve, so that in calling it by the name which I inadvertently coined (I refrain from repeating the solecism) I committed an offence against fact, as well as against language, and must be content to take the blame for both.

Thanking you for pointing this out, I am, yours faithfully, PAUL WATERHOUSE.

PRESTON HIGHER GRADE SCHOOL COMPETITION.

SIR,—A protest is contemplated in reference to this award. Any competitor desirous of being associated with the same may have a copy upon application to—

G. H. WILLOUGHBY,
3, York-street, Manchester: or
EDGAR WOOD & SELLERS,
78, Cross-street, Manchester.

WANTED—A FIRE-RESISTING STONE.

SIR,—I shall feel obliged if any reader could inform me of any stone which will resist close contact with fire without fracturing.

CLERK OF WORKS.

*** We insert our correspondent's inquiry, but we fear he will not find what he asks for.—ED.

A QUESTION OF CONSTRUCTION.

SIR,—In the current issue of the *Builder* there is a detail elevation and section of Wood Green Almshouses.

Over the front door is shown a curious piece of brickwork, being a combination of two quite flat arches with only one skew back to each, and the middle part is a semicircular arch.

Will you kindly explain how this is supported? What prevents the whole thing falling down when the centring is removed?

Is it a bit of truly constructed brickwork or a

freak? I send you a rough sketch of the part referred to, and would much like to know your opinion about it. A STUDENT.

*** The brickwork is certainly not a stable construction in itself, as shown. Perhaps Mr. Cross would give an explanation.—ED.

THE TRIBUNAL OF APPEAL UNDER THE LONDON BUILDING ACT:

KENNARD v. LONDON COUNTY COUNCIL.

ON Thursday in last week the Tribunal of Appeal sat at the Surveyors' Institution, Great George-street, to hear an appeal made by Col. E. H. Kennard, under sect. 19 of the London Building Act, against the condition imposed by the London County Council to their sanction, dated October 10, to the formation or laying out of new streets for carriage traffic in continuation of Fernhill-street and Brixham-street, North Woolwich. Mr. Courthrope Munro appeared for the appellant, and Mr. Cuningham Glen for the London County Council.

Mr. Glen objected that the appellant had no appeal under the section. It appeared that an application was made by the appellant to the Council on November 19, 1904, on which the Council made an Order sanctioning the formation and laying out of these streets, subject to certain conditions imposed. No appeal was ever made against that Order, but subsequently a correspondence took place in which the solicitors for the appellant asked the Council to modify the conditions. As the result of this correspondence the Council passed another Order on October 10, 1905, modifying the conditions. The appellant now appealed on the Order of October 10, but he submitted that there could be no appeal against an Order modifying a previous Order.

In answer to Mr. Hudson, Mr. Glen said the County Council did not cancel the first Order, but they rescinded the resolution. The Council was bound to make an Order within two months of the application.

Mr. Hudson having examined the notice given to the appellant on October 10, 1905, said the terms of the Council's resolution were to rescind the resolution of December 19, and then to sanction the laying out of new streets, as shown by the plans, etc., dated November 23, 1904. So far as he could see, therefore, the only sanction they had cancelled was the former Order.

Mr. Glen argued that it was merely a rescinding of the resolution for the making of a fresh Order, but the new Order was to read together with the previous Order. If it was anything else, then it was *ultra vires*. An Order was made once and for all, and it must stand, and could not be subsequently modified without the consent of the applicant.

Mr. Hudson said that on the face of it it seemed the mistake was made in rescinding the former resolution. The Council could only act by resolution, and that was communicated to the applicant.

Mr. Glen said it was true they had rescinded a resolution, but they had done nothing more.

Mr. Hudson: What it comes to is that the County Council instruct you that there is no power to rescind a former resolution.

Mr. Glen: They cannot rescind an Order; they can modify it.

Mr. Glen, in support of his contention that this was not a new application, read the correspondence between the parties, from which it appeared that the Council imposed the condition that land on the appellant's estate should be left unbuilt upon, so as to form a street 40 ft. wide. As the applicant had had part of the estate taken compulsorily by the Dock Company, he had not sufficient land to enable this to be done, and the result of the correspondence was that the Council, by their sanction dated October 10, 1905, modified the condition so as to allow only 30 ft. at one end of the estate to be unbuilt upon.

Mr. Munro said the position of the applicant was this. He asked the Council what was the least they would do with, and when he found out that he would not agree, but said he would go to appeal. His client never said, "Will you take this?"

After some further legal argument the Board deliberated, and the Chairman announced that the Board had decided that there was an appeal, and the case must go on on its merits.

Mr. Glen said it was a matter affecting the practice of the Council, and he must ask for a case to be stated on the point of law.

Mr. Hudson said he took it that it was a point which the County Council would appeal against.

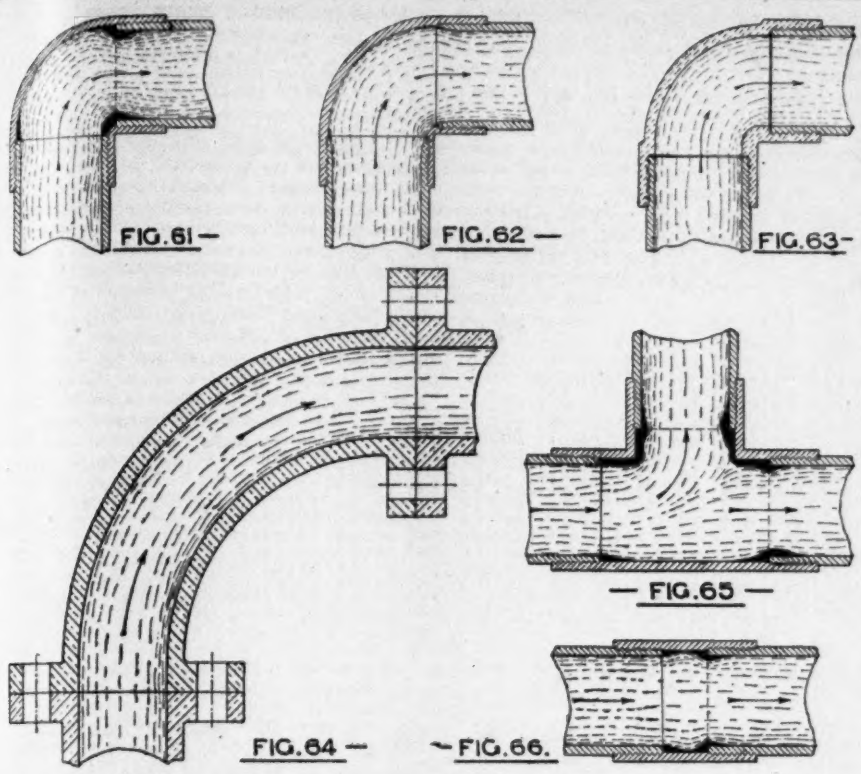
Mr. Glen said that was so.

The further consideration of the case was then adjourned.

After the hearing of the case on Thursday we understand that a meeting of the parties took place with a view to a settlement, and in these circumstances the case was adjourned *sine die*.

ISOLATION HOSPITAL, ROTHERHAM.

ON the 7th inst. a new isolation hospital was opened on the north-west side of Badsley Moor-lane, at Rotherham, by the Mayor. The building has been erected from the designs of the architect, Mr. Joseph Platts, of Rotherham, the Corporation architect, by the contractors, Messrs. Wm. Thornton & Son. The clerk of works was Mr. A. T. Ripley. The cost of the land, buildings, and furniture has amounted to 19,285*l.*, and the hospital consists of the following buildings:—Administrative block, scarlet fever, typhoid fever, and diphtheria pavilions, observation block, porter's lodge, and a block comprising laundry, mortuary, ambulance shed, engine and boiler-rooms, disinfecting-rooms, and discharge-rooms. The administrative block contains accommodation for the medical and nursing staff and for servants. It has been built sufficiently large to allow of future expansion of the hospital. On the ground floor are the medical officer's office, dispensary, bacteriological laboratory, sitting-room for the matron, dining and recreation-rooms for nurses, kitchen, scullery, store-rooms, and pantries. On the first floor are fifteen bedrooms (each fitted with lavatories with hot and cold water), bath-room, and linen closets. Separate staircases are provided for nurses and maids. The corridors and passages are heated by hot-water coils, and the building is lit throughout by electricity from the Corporation Electrical Works. Telephones connect this block with each of the wards as well as with the National Telephone Exchange. The different wards are arranged on the pavilion system, and each has a frontage to the south-east. There are four ward blocks, each with equal accommodation for males and females. There are glass-covered verandahs in front. Attached to each block is a kitchen, bath-room, stores, and linen cupboards, slop sink and lavatory. The wards are heated with double coal fires with ascending flues; hot-air chambers are found at the back of each stove. Ventilation is by grids and shafts in the ceilings and extracts on the ridges. Hopper-top openings are provided to each window, and the windows can be opened by sashes above and below. Fresh-air inlets are under each bed. The floors of the wards are of polished pitch pine; those of the other rooms are finished in cement and granite riddlings. The inside walls are lined to a height of 4 ft. with Keene's cement. The junction with the floor forms a curve to avoid the lodgment of dust. Above the dado the lining is of Robinson's cement. All the splays to the windows have rounded finishings, and the angles with the ceiling are curved. Apertures are provided in the walls at the ends of the wards, through which soiled linen and coals can be passed, thus obviating the necessity for the porter to enter the wards. The scarlet fever block consists of two wards of eight beds each with a floor space of 156 super. feet and 2,106 cubic feet per bed. There are two small wards, each containing one bed and having separate entrances. These are for the accommodation of special cases which it is desirable to keep apart from the others. The diphtheria block has a similar arrangement to the scarlet fever block, but the main wards only accommodate six beds in each. One of the small wards is fitted up for use as an operating-room in cases where the operation of tracheotomy requires to be performed. The typhoid fever block is similar in dimensions, accommodation, and arrangement to the diphtheria block. The observation block contains two wards of two beds each. The laundry block comprises wash-house, fitted with washing machines, sparger, rinser, and bluer, centrifugal drying machine, drying closet, and other up-to-date appliances. There is also a mangling-room. Part of this block contains the steam disinfector, which is fixed in the wall between two rooms into one of which infected clothing is brought, and from the other the clothing is removed after passing through the disinfector. At one end of the block are the ambulance shed and stables, and at the other is the discharge block and the mortuary. The discharge block consists of three rooms, the



Illustrations to Student's Column.

central one containing a bath. The mortuary is so arranged that the friends of the deceased can view the body through a glass partition. The porter's lodge is erected near to the entrance to the hospital.

The Student's Column.

STEAM BOILERS AND PIPES.—XXIV.

THE FLOW OF STEAM (*continued*).

IN preceding articles it has been shown that the weight of steam delivered through pipes varies with the length of the conduit, and that the reduction of discharge is proportionately greater in small pipes than in large pipes owing to the increase of frictional resistance as the diameter is reduced, and that, apart from theoretical considerations, there are practical reasons for further reduction in the carrying capacity of steam pipes, this further diminution being also inversely proportional to the diameter of the pipes.

As pipes of small diameter are far more liable than larger pipes to be partially choked in the manner indicated, it is only reasonable that suitable compensation should be made when pipes are used that are liable to corrosion, and that cannot be kept free from water.

It must be also borne in mind that the ends of wrought-iron pipes as fitted are rarely of the full diameter, owing to the contraction of area caused by the use of the wheel cutter. Hence we see that the weight of steam discharged through small pipes is liable to be very seriously reduced by causes which are well known to practical engineers, but are not recognised by mathematical formulæ. In point of fact, it would be impossible to devise any equation expressing the various obstacles to flow that result from differences of material, design, and workmanship.

Fortunately, an easy means of making allowance for such causes of diminished flow is provided by the excess of the "commercial" over the "nominal" internal diameters of wrought-iron and cast-iron pipes, and the inverse proportion of such excess to the nominal diameter.

Although, as we pointed out last week, there is no standard internal diameter for steam pipes, it is probable that the ratio of nominal to commercial measurement does not vary to any considerable extent in the pipes of different makers, and for the purpose of indicating the difference in a general way we give in Table XXVIII. the nominal and actual internal diameters of wrought-iron steam tubes as made (A) by Messrs. John Russell & Co., and (B) Messrs. J. E. & S. Spencer, and (C) the corresponding American standard diameters.

TABLE XXVIII.—SIZES OF SOME WROUGHT-IRON STEAM TUBES.

Internal Diameter (Inches).					External Diameter (Inches).			
Nominal Bore.		Actual or "Commercial" Bore.						
Fractions.	Decimals.	(A) John Russell & Co.	(B) J. E. & S. Spencer.	(C) American Standard.	British Standard.	(A) John Russell & Co.	(B) J. E. & S. Spencer.	(C) American Standard.
⅛	0·125	0·198	0·167	0·27	0·406	0·406	0·375	0·405
¼	0·25	0·323	0·292	0·364	0·531	0·531	0·5	0·54
⅜	0·375	0·455	0·393	0·494	0·687	0·687	0·625	0 675
½	0·5	0·587	0·556	0·623	0·843	0·843	0·8125	0·84
¾	0·75	0·774	0·774	0·824	1·062	1·062	1·0625	1·05
1	1·	1·023	0·992	1·048	1·343	1·348	1 3125	1·315
1¼	1·25	1·335	1·273	1·38	1·687	1·687	1·625	1·66
1½	1·5	1·522	1·491	1·611	1·906	1·906	1·875	1·9
1¾	1·75	1·678	1·678	—	2·156	2·062	2·0625	—
2	2·	1·951	1·991	2·067	2·375	2·375	2 375	2·375
2¼	2·25	2·201	2·326	—	2·625	2·625	2·75	—
2½	2·5	2·576	2·576	2·468	3·	3·	3·	2·875
2¾	2·75	2·826	2·826	—	3·25	3·25	3·25	—
3	3·	3·076	3·076	3·067	3·5	3·5	3·5	3·5
3½	3·5	3·576	3·576	3·548	4·	4·	4·	4·
4	4·	3·951	4·076	4 026	4·5	4 375	4·5	4·5
4½	4·5	4·536	4·5	4·508	5·	5·	5·	5·
5	5·	5·036	5·	5·045	5·5	5·5	5·5	5·563
5½	5 5	5 536	5·5	—	6·	6·	6·	—
6	6·	6·036	6·	6·065	6·5	6·5	6·5	6·625

From this table it is clear that the progressive increase from large down to small diameters has the effect of compensating in a suitable manner, and probably to a sufficient extent, for the obstructions to flow in the smaller sizes.

In the United States, where wrought-iron pipes are made to a universal standard of diameter, various tables have been calculated upon actual pipe dimensions for the discharge of steam and for the equalisation of pipe areas. One or two of these tables have been reprinted in books published in this country, but the figures do not apply to British pipe dimensions. We do not consider it good practice to borrow data in this manner, and, as remarked in connexion with Table XXVII., it is better to await the settlement of a British standard before calculating upon "commercial" diameters.

Therefore, for the present, we have been content to present in Table XXVII. the discharges of steam for pipes of clearly-defined sizes, and now give in Table XXIX. the comparative values of pipes upon a similar basis.

If the "commercial" diameters were taken into account some of the smaller sizes would possess somewhat greater values than those shown by the table, while the values for other sizes would be less than those in the table, the figures varying in accordance with the unknown standards of different makers.

Consequently, under existing circumstances, data such as those in Tables XXVII. and XXIX. are far more reliable than data copied from American books and not applicable to British-made pipes.

The Resistance of Fittings and Valves.

The reduction of flow through bends and elbows is due (1) to change of direction of the steam, (2) to friction against the sides of the fitting, and (3) to eddies caused by enlargements and contractions. We do not refer here to square elbows, as such fittings should never be used under any circumstances whatsoever, and we cannot imagine why they are still offered for sale.

(1) The loss of head, with consequent reduction of discharge, for change of direction varies with the curvature of a bend, and the most recent experiments appear to indicate that a curve with the radius of 2·5 diameters offers less resistance than any other curve, a bend with this curvature being equivalent to a piece of straight pipe having the length of about 3·4 diameters. This, of course, refers only to loss by change of direction.

(2) The loss due to friction against the interior surface of a bend or elbow is the same as that obtaining in the case of a straight pipe of equal length and diameter, and with an interior surface of similar character.

(3) The loss due to eddies applies to any bend or elbow having an internal diameter greater than that of the pipe to which it is connected, thus causing enlargement of area, and applies also to any bend or elbow screwed upon a pipe whose end forms a shoulder, causing contraction of area. The usual form of wrought-iron bend, being simply a curved piece of pipe, causes no enlargement of area, and the only source of loss in respect of the third cause is that due to the connecting sockets.

The greatest loss from this cause occurs in the case of an elbow fitted as shown in Fig. 61. By cutting away the shoulder, as in Fig. 62, the loss can be reduced to a minimum, but this is a refinement of rare occurrence in pipe work. If the fittings were made so that the pipes could be screwed into sockets, as in Fig. 63, there would be no loss from enlargement and contraction of area. The same remark applies also to flanged bends and elbows (see Fig. 64).

The reduction of flow through the outlet of a right-angled tee-piece with ordinary screwed connexions is at least 50 per cent. greater than that in an elbow, owing to enlargement and contraction at the three points of connexion. Fig. 65 illustrates the action in an ordinary tee-piece, which is a fitting of the most undesirable form. The first, second, and third causes of loss apply to all tee-pieces, the influence of the third cause varying with the manner in which the joints are made (see Figs. 61 to 64).

The second and third causes of loss apply to sockets and couplings, the extent of

TABLE XXIX.—PIPE EQUALISATION TABLE. FOR PROPORTIONING THE DIAMETERS OF MAIN AND BRANCH STEAM PIPES.

(Based upon the diameters stated in the horizontal and vertical lines.)

Dia.	⅜	½	⅝	¾	⅞	1	1¼	1½	1¾	2	2½	2¾	3	3½	3¾	4	4½	5	5½	6	7	8	9	10	11	12
⅜	1·0																									
½	5·6																									
⅝	15·6	2·7																								
¾	32·0	5·6	2·0																							
⅞	56·0	9·8	3·5	1·7																						
1	88·5	15·6	5·6	2·7	1·5																					
1¼	182·1	23·3	8·4	4·1	2·3	1·4																				
1½	181·8	32·0	11·6	5·6	3·2	2·0	1·3																			
1¾	314·5	55·4	20·0	9·8	5·6	3·5	2·3	1·7																		
2	499·2	88·1	32·0	15·6	8·9	5·6	3·7	2·7	1·5	1·4																
2½	736·4	129·8	47·0	23·0	13·1	8·3	5·6	4·0	2·3	2·0	1·3															
3	1027·0	181·0	65·6	32·0	18·3	11·6	7·7	5·6	3·2	2·8	1·8	1·3														
3½	1380·0	243·2	88·1	43·1	24·6	15·6	10·4	7·5	4·3	3·7	2·4	1·7	1·3													
3¾	1797·0	320·6	114·8	56·1	32·0	20·2	13·5	9·8	5·6	4·8	3·1	2·2	1·6	1·2												
4	2280·0	401·9	145·6	71·2	40·7	25·7	17·2	12·5	7·2	6·2	4·0	2·7	2·0	1·5	1·2											
4½	2832·0	499·2	180·9	88·5	50·5	32·0	21·4	15·5	9·0	7·7	5·0	3·3	2·5	1·9	1·5	1·2										
5	3461·0	610·2	221·2	108·1	61·8	39·1	26·1	19·0	11·0	9·4	6·1	4·0	3·0	2·3	1·8	1·4	1·2									
5½	4165·0	734·2	266·1	130·2	74·3	47·0	32·0	22·9	13·2	11·3	7·3	4·8	3·6	2·8	2·2	1·7	1·4	1·2								
6	4949·0	872·4	316·1	154·6	88·3	55·9	37·4	27·2	15·7	13·4	8·7	5·7	4·3	3·3	2·6	2·0	1·7	1·4	1·1							
7	6817·0	1025·0	371·6	181·0	103·9	65·7	44·0	32·0	18·4	15·6	10·2	6·7	5·0	3·8	3·0	2·3	2·0	1·6	1·3	1·1						
8	7809·0	1377·0	498·9	244·1	139·4	88·2	59·0	42·9	24·8	21·0	13·8	9·0	6·8	5·1	4·0	3·1	2·7	2·2	1·8	1·5	1·3					
9	10160·0	1792·0	649·2	317·7	181·0	114·8	76·9	55·9	32·0	27·3	17·9	11·8	8·8	6·6	5·2	4·0	3·5	2·9	2·4	2·0	1·7	1·3				
10	12890·0	2273·0	823·7	403·0	230·2	145·6	97·5	70·9	41·0	35·0	22·8	15·0	11·2	8·4	6·6	5·1	4·5	3·7	3·0	2·6	2·2	1·8	1·2			
11	16030·0	2826·0	1024·0	499·0	286·3	181·0	121·3	88·1	50·9	43·5	28·4	18·6	13·9	10·5	8·2	6·3	5·6	4·6	3·8	3·2	2·7	2·3	1·5	1·2		
12	23570·0	4156·0	1505·0	736·7	420·9	266·3	181·0	129·6	74·9	64·1	41·8	27·4	20·5	15·5	12·1	9·3	8·3	6·8	5·6	4·7	4·0	3·3	2·3	1·8	1·4	
13	32910·0	5801·0	2102·0	1028·0	587·6	371·7	253·0	181·0	104·7	89·6	58·4	38·3	28·6	21·6	16·9	13·0	11·6	9·5	7·9	6·6	5·6	4·6	3·2	2·5	2·0	1·3
14	44180·0	7787·0	2822·0	1380·0	788·9	499·0	334·3	243·0	140·5	120·3	78·4	51·4	38·4	29·0	22·7	17·5	15·6	12·7	10·6	8·9	7·5	6·2	4·3	3·4	2·7	1·8
15	57490·0	10140·0	3673·0	1797·0	1026·0	649·4	435·0	316·2	181·0	156·4	101·9	66·8	49·9	37·7	29·5	22·8	20·2	16·6	13·8	11·6	9·8	8·1	5·6	4·4	3·5	2·4
16	72950·0	12860·0	4660·0	2280·0	1302·0	823·9	552·0	401·3	231·9	181·0	129·2	84·8	63·3	47·8	37·4	28·9	25·7	21·0	17·5	14·7	12·5	9·3	7·1	5·6	4·5	3·0
17	90670·0	15990·0	5793·0	2834·0	1619·0	1026·0	686·1	498·8	288·3	181·6	123·1	88·2	65·7	50·4	39·7	32·0	26·2	21·7	18·3	15·6	11·6	8·9	7·0	5·6	3·8	2·7
18																										
Dia.	⅜	½	⅝	¾	⅞	1	1¼	1½	1¾	2	2½	2¾	3	3½	3¾	4	4½	5	5½	6	7	8	9	10	11	12

This table shows the number of small pipes equivalent to one larger pipe, with due allowance for friction, the number of pipes being found at each intersection of the horizontal and vertical line. If friction were disregarded the equivalents would be very different. For instance, the area of one 6-in. pipe is equal to the sum of the areas of sixteen 1½-in. pipes, but we find in the table that one 6-in. pipe is really equivalent to thirty-two 1½-in pipes.

The first vertical line of numbers gives the relative values in terms of ¼-in. diameter pipe for the diameters in the adjoining vertical column; and within the limits of the table enables the user to find the proper diameter for a main steam pipe to supply any given number of branches of different diameters. Thus, the table shows that the values for 2 × 4 in., 1 × 3 in., and 1 × 2½ in branches are 11,634 + 2,832 + 1,380 = 15,846. Hence a 6-in. main having the value 16,030 will be of the proper diameter to supply the branches named.

enlargement and contraction depending upon the character of the joints employed. Fig. 66 indicates approximately the effect of an ordinary socket upon the flow of steam. As a general rule, it may be said that the average resistance in a straight-through socket coupling is about one-fifth of that in a round elbow.

The resistance caused by valves varies, according to the details of the design, from 50 per cent. to 150 per cent. more than the resistance offered by a round elbow.

Although the effect of any given fitting upon the quantity of steam delivered can be calculated with substantial accuracy, it would be out of the question for any architect or engineer to determine the resistance of every bend, elbow, tee-piece, coupling, and valve in an extensive system of pipes. The labour involved by a long series of calculations would be out of all proportion to the utility of the information obtained, and for practical purposes it is quite sufficient to take as data certain equivalent lengths of straight pipe to represent the average resistance offered to the flow of steam by the different kinds of fittings commonly employed.

Round Elbows.—Practical experience and experimental investigation show that in an ordinary screwed round elbow of 90 deg. the loss of head due to change of direction is the same as the loss in a straight pipe of the same nominal diameter, and with a length equal to about 40 diameters.

The loss due to friction in an elbow can be disregarded if, in measuring the pipe line, allowance be made for the length of each fitting.

The loss due to enlargement and contraction of area in an ordinary screwed elbow is represented by an equivalent length of straight pipe about 60 diameters long.

Thus the total loss due to an ordinary screwed elbow may be stated at 100 diameters.

But if the shoulders of the connected pipes are carefully reamed out, as shown in Fig. 62, the loss from the third cause can be reduced to the equivalent of about 10 diameters, making the total loss for the elbow equal to 50 diameters only.

Further, if flanged or other flush joints are used, and if the internal area of the elbow is the same as that of the connected pipes, the loss of head from the third cause is reduced to zero, and the total loss for the elbow becomes 40 diameters.

Bends.—For an ordinary screwed bend with a radius of 2·5 diameters the equivalent for loss by change of direction is 3·4 diameters, say, 4 diameters. For a similar bend of less favourable radius the equivalent may be averaged at 10 diameters.

The loss by friction can be disregarded, on the understanding that all fittings are measured in the length of the pipe line.

As wrought-iron bends have the same area as the connected pipes, no losses arise from the third cause, and the total loss for an ordinary screwed bend may be regarded as ranging from 4 diameters to 10 diameters. These values apply equally to flanged pipe bends.

Tee-pieces.—For ordinary screwed tee-pieces the loss due to change of direction through the outlet is greater than that in a round elbow, and may be averaged at 60 diameters.

The loss by friction can be disregarded as before, subject to due allowance being made for length in the pipe measurements.

The loss arising from enlargement and contraction of area in wrought-iron tees is probably not less than the equivalent of 100 diameters when the pipe ends are left square.

Using these values the total loss for a tee-piece equals 150 diameters.

But when the shoulders are reamed off, as in Fig. 62, the loss from the third cause is reduced to about 15 diameters, making the total loss equivalent to 75 diameters.

For flanged tees with internal area the same as that of the connected pipes the third portion of the loss is eliminated, and the total loss is equal to about 60 diameters.

Sockets and Couplings.—In the case of sockets and screwed couplings there is some loss from enlargement and contraction of area, the value ranging from 10 diameters to 20 diameters according to the finish of the pipe-fitter's work.

Valves.—The design of valves varies so greatly that it would be difficult to state values that are even approximately reliable for different types. For the purpose of general guidance in settling the proportions of pipe systems, the resistance of full-way valves may be taken at 100 diameters for screwed pipe, or 40 diameters for flanged pipe, and the resistance of globe valves at 200 diameters for screwed pipe, or 60 diameters for flanged pipe.

Erratum.—In examples (31) and (33) read 400 ft. for 100 ft., and in example (32) read 100 ft. for 400 ft. This only applies to the statements of data, the calculations being printed correctly.

OBITUARY.

MR. EATON.—The death is announced of Mr. John Eaton, C.B., senior member of the firm of Messrs. John Eaton, Sons, & Cantrell, of Stamford-street, Ashton-under-Lyne, architects. Mr. Eaton was elected a Fellow of the Royal Institute of British Architects in 1882, and was elected a Vice-President of the Manchester Society of Architects for the session 1904-5. Having served as a pupil in his father's offices he became an assistant of Mr. Moffatt, of Manchester. Amongst the principal architectural works carried out by the firm are the following, in chronological order—School buildings for the Dukinfield School Board, at a cost of nearly 9,000*l.* for the structure; the Conservative Club, Mottram-road, Stalybridge; the Church Inn, Millbrook, Stalybridge, for Swales Brewery Company, Ltd.; business premises in Warrington-street, Ashton-under-Lyne; and enlargement, with improvements, of the St. Mary's Church Schools, Droylesden; the drill-hall and headquarters of the 3rd Volunteer Battalion of the Lancashire Fusiliers in Cross-lane, Salford (1899); the Miners' Arms, and alterations, etc., of the Welcome Home Inns, Ashton-under-Lyne; club premises, Stalybridge; the gun store and extension of headquarters, Manchester; stables, etc., at Tan-y-Bryn, Abergele, for Colonel J. E. Mellor; bank and post-office premises at Dukinfield for Parr's Bank; the nurses' home, Ashton-under-Lyne, for the Union Guardians, at a cost of about 6,500*l.*; and the Queen's Hotel, Hyde. Two years ago the firm laid down a system of water-mains for the Ashton-under-Lyne Guardians, and in 1898 they won the first premium with their plans and designs for the Dukinfield Town Hall. Messrs. John Eaton & Sons were the architects of the Conservative Club, Dukinfield, in the late Tudor style, 1872-3, and of the Heginbottom Technical Schools, School of Art, and Free Library, Ashton-under-Lyne, after the early English style, erected at a cost of about 15,000*l.* and opened in 1893. Mr. Eaton, who resided at Strathdene, Taunton-road, was a borough magistrate, and as Colonel of the 3rd Volunteer Battalion of the Manchester Regiment received the Volunteer Decoration.

MR. GREEN.—Mr. James Green died on December 5 at his residence in Prince of Wales's-road, Kensington. He was a member of the firm of Messrs. Weatherall & Green, of Chancery-lane, surveyors, valuers, auctioneers, and land agents, and during many years past enjoyed an extensive practice. His services were employed in several cases on behalf of the Crown, the London County Council, and various public and private bodies, in respect of valuations and arbitrations, and he frequently acted as umpire or expert in controversial proceedings under statutory enactments relating to the acquisition or valuation of landed property.

CHURCH, ASHTEAD, SURREY.—Lord Ashcombe laid the foundation-stone recently of the new church which is being erected in place of the present iron church, in Barnett Wood-lane, Lower Ashtead. The new building will give seating accommodation for 350 people. The fabric will be of red brick, covered with red tiles. The flooring of the nave and aisle will consist of wooden blocks, while the flooring of the chancel will be laid with Rust's mosaics. The roof will be an open one on hammerbeam principals, and covered with wrought boarding. In the chancel the roofing will be panelled. The south aisle is omitted from the present plan of the building, which will be completed at a later date, and the portion of the building in course of erection will include the nave, chancel, north chapel and baptistry. The church will be surmounted by a fleche, covered with oak shingles, rising to a height of 80 ft. Honeyman's ventilators will be inserted in the building. The style of the church is early English, with lancet windows and dormer windows in the roof. The architects are Sir Arthur Blomfield & Sons, and the builders Messrs. J. Dorey & Company, of Brentford. The present contract is for 2,700*l.* The cost of the building completed will reach 3,600*l.*

GENERAL BUILDING NEWS.

CHURCH, LIDGET GREEN, BRADFORD.—The new Church of St. Wilfred's, at Lidget Green, occupies a site opposite the mission church in Clayton-road. The architect is Mr. Temple Moore, of London. Rectangular in shape, the building has three main entrances, one being in the centre of the west end, and side entrances with porches at the north and south corners. The aisles are divided from the nave by pillars and arches, and the roof is plain and of circular form. The total cost, exclusive of furniture and the site, is about 9,000*l.*

CHURCH, BEN RHYDDING.—The new church of St. John the Evangelist, at Ben Rhydding, at present consists of nave and chancel, which, together with the site, have cost 3,320*l.* Accommodation has been provided for about 300 persons, and the building is from the plans of Mr. H. S. Chorley (Connon & Chorley, Leeds), The builders are Messrs. Dean Brothers, Ilkley.

NEW PARISH CHURCH, GLASGOW.—On the 2nd inst. Lord Provost Bilaland laid the memorial stone of the new St. Paul's Parish Church, which is in course of erection on a site in North John-street, Glasgow. The design is that of Mr. John M'Intyre, architect, Edinburgh. The building consists of a suite of two halls with basement entering from Little Hamilton-street and Margaret-street, and a church comprising nave and side aisles with a gallery at the east end of the nave. Accommodation is provided for 950 worshippers. The principal entrance to the church is from John-street at the north end of the building and leads to the north aisle. There is another entrance by an external stair and a vestibule underneath the tower at the corner of John-street and Little Hamilton-street. Cloak-room accommodation has been provided for both sexes. The vestry, session-house, and other rooms are entered from Margaret-street. The church, which is in the Renaissance style, is being built of red freestone from Locharbriggs Quarry. The contractors are: Builders, Messrs. Ebenezer M'Morran & Son; joiners, Messrs. John Baxter & Son; ironwork, Mr. John Mundy; plumbers, Messrs. Muir & Son; plasterer, Mr. John Quarrier, and heating, Messrs. Steel & Steven. Mr. W. M. Scott is master of works. The cost of the building will be about 10,000*l.*

BAPTIST CHURCH, SHOOTERS' HILL.—The opening services in connexion with the new Baptist Church in Shooters' Hill-road took place recently. The building, which occupies a corner site at the junction of Marlborough-lane, is Perpendicular in style, the exterior being faced with red bricks and Bath stone dressings. At the corner rises a square tower, 60 ft. high, with battered angle buttresses, terminating in carved pinnacles. The main gable contains a traceried window; below this projects the ground floor entrance porch, on the east side of which is the tower, containing one gallery staircase, and on the west side the turret with a second staircase. On the ground floor additional exits are provided in each transept. The seating on the ground floor is circular in plan, the total accommodation, including the galleries, is for 800 persons. The roof, which is carried on four columns with arches between, is of pitch pine, as is also the open traceried gallery front. Under the pulpit is the marble baptistry, access to which is obtained either from the platform in the church or from the choir vestries at the rear. Deacons and minister's vestries are also provided. The architects, whose design was selected in competition, are Mr. Samuel S. Dottridge, of Blackheath, and Mr. W. J. Walford, of Leadenhall House, E.C., and Messrs. Patman & Fotheringham, of Theobald's-road, W.C., have been the contractors for the work.

CONGREGATIONAL CHURCH, LLANTWIT MAJOR.—Services in connexion with the re-opening, after rebuilding, of Ebenezer Congregational Church, Llantwit Major, have just been held. The new building is of stone quarried upon the site, and has dressings of St. Aldhelm stone. The roof is covered with green slates. The accommodation in the body of the building is for 270 persons, including sixty in a gallery at the west end. There is a vestry at the back, and a heating chamber in the basement. The heating apparatus, which is on the low-pressure hot-water system, has been carried out by Messrs. J. G. Proger & Sons, of Cardiff. The contractor was Mr. J. E. Chatterton, of Llantwit Major. The architects were Messrs. Cook & Edwards, of Bridgend.

BAPTIST CHURCH, PLYMOUTH.—The memorial-stone of the new Baptist Church, to be erected at Salisbury-road, Plymouth, has just been laid. Mr. F. A. Wiblin is the architect.

TAUNTON SCHOOL.—Mr. Frank Wills has made designs for the chapel, to accommodate about 300, which Sir W. H. Wills will erect at his own cost and present to the governors of the school.

BOARD SCHOOL, EDINBURGH.—Warrant was granted in the Edinburgh Dean of Guild Court, on the 30th ult., to the Edinburgh School Board, for the erection of a new school at Upper Gilmore-place, which will be known as the Gilmore-place School. A site embracing 5,500 sq. yds. has been obtained, and the building is designed to accommodate 1,486 pupils. The school will consist of three floors, the lower one of which will be devoted entirely to the infant department, and the two upper to the juvenile department. In addition to the twenty-six classrooms there will be a workshop and combined cookery-room and laundry. A large central hall is provided for each of the departments, and each has a gallery. There will be three playgrounds—one for boys, one for girls, and one for infants. Mr. J. A. Carfrae is the architect, and the following are the names of the contractors:—Messrs. James Millar & Sons, mason and joiner work; J. A. M'Lauchlan, plaster work; Redpath, Brown, & Co., iron work; P. Knox & Sons, plumber work; William Anderson & Son, slater work; A. Hutton & Son, painter work; A. Cunningham & Co., glazier work; and A. Bowman, granolithic work. It is estimated that the total cost of the school, apart from the site, will amount to about 20,148*l.*

PROPOSED SECONDARY SCHOOL, POOLE.—Mr. G. A. Bligh Livesay, architect, has prepared the plans, specifications, and estimate for the proposed new secondary school to be erected on a site at Seldown, Poole. The buildings are to provide accommodation for 200 scholars, of whom 60 will be in the pupil teachers' centre, and 140 in the secondary school. The architect's estimate is 6,350*l.*, which includes boundary walls and fences.

ISOLATION HOSPITAL FOR HARROGATE, KNARESBOROUGH.—On the 28th ult. the new isolation hospital, which has been erected at Knaresborough, was opened. Twenty-four acres of land were purchased at Thistle Hill, Knaresborough, and invitations were issued to architects to compete with plans for the new buildings, and the designs of Mr. G. H. Stanger, of Wolverhampton, were accepted, but Mr. Stanger did not live to see the completion of the work, and since his death his partner, Mr. Arthur W. Worrall, has supervised the operations. The various blocks of buildings are scattered over some 8½ acres of the site. The buildings are of local stone, and the cost will be about 25,000*l.* From the main road a carriage drive leads past a porter's lodge to the administrative block, on the ground floor of which are the matron's and nurses' sitting-rooms, doctor's-room, and dispensary, kitchen, scullery, and store-rooms, the bedrooms and bath-rooms being on two upper floors. The hospital proper is divided into four pavilions. The scarlet fever block contains twenty beds, and the typhoid block twelve beds, each pavilion having two general wards and two single-bed wards for private patients. The diphtheria block has eight beds in two general wards. The fourth pavilion, containing eight beds, is for doubtful cases. Altogether there is accommodation for nearly sixty patients. All the pavilions are within easy reach of the administrative blocks. Their general internal arrangements are similar. They are so situated as to obtain a maximum amount of sunlight, and windows are placed close to the angles in order to increase this advantage. All the windows and fanlights can be opened. The wards are heated by Shorland's stoves and grates, supplemented by steam radiators, the steam being generated in two large Cornish boilers. Outlets for vitiated air are provided at ceiling level in all wards and rooms. The corners of the walls are rounded, the floors of the wards are laid with oak blocks and other floors with terrazzo paving; and inverted indcandescent gas burners are used for illumination. Amongst the subsidiary buildings are the discharge block, which is fitted with bath-room, and the laundry and disinfecting block. The contractors are:—Bricklayer and mason's work by Messrs. Simpson & Sons, Harrogate; joiner's by Mr. J. W. Rudd, Harrogate; plumbing and glazing by Mr. G. Thompson, Leeds; plastering by Messrs. Fortune & Calverley, Harrogate; slating by Mr. W. Shepherd, Harrogate; ironwork by Messrs. Atkinson, Harrogate; painting by Messrs. J. Morley & Son, Knaresborough; and the engineering, including heating, hot-water supplies, laundry machinery, etc., by Messrs. Lea & Warren, Kettering. Messrs. Shorland Bros. supplied the ward stoves and grates; the terrazzo floor was executed by Messrs. Diespeker. Messrs. Bayliss, Jones, & Bayliss, Wolverhampton, supplied the barbed wire boundary fencing; and Mr. Steinthal, Bradford, the electric bells. The laying-out of grounds and planting were done by Mr. Lister Kershaw, of Brighouse.

ASSEMBLY HALL, DEBENHAM.—The Foresters' Hall at Debenham was opened recently. The principal entrance to the new building is from the street, up a flight of Portland stone steps into an open vestibule; thence into the Crush Hall, about 18 ft. by 14 ft., which is fitted up with a ticket-office at the far end. This hall will also form a committee-room when so required. The main hall, which is lighted by twenty windows and ventilated by Boyle's patent exhaust air pump ventilators, is about 60 ft. long by 38 ft. wide, access being through two doors from the crush hall. The hall has four double emergency exits, besides the ordinary doors. At one end is a stage and at a higher level is the balcony in horse-shoe shape, with rising tiers of seats, access to which is had by staircases on either side. Behind the balcony rises a large gallery, fitted up with tiers of seats. The architect was Mr. Raymond C. Wrinch, of Ipswich and Felixstowe; Mr. Allen Hudson, of Ipswich, being clerk of works. The stonework to the front elevation has been executed by Mr. E. Saunders, of Ipswich, with Mr. W. E. Willett as carver. The contractor for the main building was Mr. H. Gooding, of Debenham, the constructional ironwork being supplied by Messrs. Cocksedge & Co., Ipswich; the heating apparatus, fire-escape stairs, and main seating by Messrs. Wrinch & Sons, Ipswich; the gas work and fittings by the Ipswich Gaslight Company, and the main stairs by Mr. Thwaites, of Ipswich.

CHURCH HALL, THROCKLEY, NORTHUMBERLAND.—A new church hall has been erected at Throckley by the Methodist community. The new premises are built of stone and comprise a lecture-hall to seat 150, with a class room at one side which can be thrown into the hall by means of a partition and gives additional accommodation for twenty persons. At the back of the hall is a speakers' ante-room, cloak-room, and lavatory, all connected to the existing church by a corridor. The minister's and sterwards' vestries have also been remodelled. The front windows are filled in with leaded glazing from the studio of Mr. Baguley. The heating is on the low pressure system, carried out by Messrs. Dinning & Cooke, plumbing work by Mr. Ernest Byles, of Newcastle, and the painting and glazing by Mr. M. J. Rutter, of Lemington, and the contract for the work has been executed by Messrs. Brown & Bell, of Newcastle, from designs by Mr. J. Walton Taylor, architect, Newcastle.

FIRE-STATION, BIRMINGHAM.—A new fire-station is in course of erection at Bordesley-green, Birmingham. Covering an area of 1,888 sq. yds., the cost of the site was 783*l.*, and, inclusive of furniture, the cost of the building will be 9,500*l.* Mr. John Price, the City Surveyor, prepared the plans for the work.

FIRE-STATION, SUTTON, NEAR BIRMINGHAM.—On the 1st inst. the new fire-station, built to the right of the new town hall in course of erection at Sutton Coldfield, was opened. The building is Renaissance in style, and the front is of local sand-stock facing bricks and Bath stone dressings. The entrance is from Upper Clifton-road, facing Anchorage-road. The engine-room is 36 ft. by 30 ft., giving accommodation for three machines. Over this room is a recreation-room for the use of the firemen, with sliding pole communication with the machine-room. At the back is the harness-room and stabling for four horses. Between the fire-station and the town hall is a campanile, 60 ft. high to the top of the parapet, with a four-faced clock, 54 ft. from the ground. This campanile answers the double purpose of an air-ventilating shaft and hose-drying tower. The fire-station and the town hall will cost over 10,000*l.*, of which sum the former building will involve some 2,000*l.* The architect is Mr. A. R. Mayston, and the builders Messrs. T. Elvin & Sons, of Handsworth.

THEATRE, SUNDERLAND.—The Sunderland Building Committee have approved of an amended plan by Mr. Hope for a theatre in Crowtree-road, South-street, and West-street. It is proposed to pull down the present block of property, and erect on the site a theatre and six lock-up shops, the building to be 53 ft. in height from the footpath to the eaves. The stalls will accommodate 180 adults, the pit 450, circle and boxes 700, and the gallery 800.

STOCKPORT WORKHOUSE INFIRMARY.—Mr. G. N. Andrew, Chairman of the Stockport Board of Guardians, opened the new workhouse infirmary at Stepping Hill on the 7th inst. The buildings will afford accommodation for 340 patients, a home for thirty-six nurses, and housing for twenty-four officials and servants. The administrative block and a large waiting hall occupy the central position; there are on each side of the main corridor two pavilions, each for men and women, having three floors, and at the end exercise verandahs and escape staircases. The cost is estimated at 130*l.* per bed. Mr. W. H. Ward, Birmingham, was the architect.

QUEEN VICTORIA MEMORIAL SCHOOL, DUNBLANE.—Sketch plans of the Queen Victoria Memorial School at Dunblane have been approved. Working plans and measurements will be ready by March 1, when tenders will be advertised for. The plans show accommodation for 194 boys, and the school will be built on ground extending to between thirty and forty acres at the Drums of Kippendavie, about a mile north-east of Dunblane. The building will be brick harled, but with a stone front. Mr. J. A. Campbell, of Glasgow, is the architect.

BUILDING IN BIRMINGHAM.—The generally-depressed condition of the building trade is reflected in the annual report just issued by the Birmingham City Surveyor, which shows that building operations have been considerably less active during the year under review than has been the case for the past five years. The total number of plans submitted to the Corporation for approval was only 1,061, as compared with 1,563

in the previous year, and 2,252 in 1902-3. In houses and shops alone there has been a decrease since last year of 385, and of 1,088 as contrasted with 1902. In all some 1,400 buildings have been completed during the year, but they largely represent an inheritance from the previous year, when the plans were adopted and building operations in the majority of cases commenced. There has been no diminution, however, in the amount of work which devolves upon this important department of the Corporation. With the object of safeguarding the public, over 1,100 notices had been served, in addition to which nearly two thousand inspections have been made under the Factory and Workshops Act, while ninety-nine notices had been served requiring additional means of escape in case of fire. Attention has also been devoted to the theatres and music-halls with a similar object. The most important work carried on during the year has been the commencement and partial completion of the works designed to relieve the Rea main sewer, which for many years past has been subject to overcharging through the admission of excessive volumes of storm-water. The storm-water sewer in Ladypool-road has also been extended along Brighton-road so as to prevent the flooding of building land, and important works of a similar nature have been carried out in other parts of the city. The department has had 269 miles of declared highways under its control, entailing a large expenditure in repairs, scavenging, etc. During the year 20,564 loads of snow have been removed, the work providing occupation for a large number of unemployed. Attention has also been given to a large number of other matters, such as street naming, house numbering, tree pruning, the provision of seats, lamps, and public conveniences.—*Birmingham Post.*

CLUB PAVILION, GLASGOW.—A new pavilion has been erected in the Kilmarnock road for the Whitecraigs Club. The building comprises two stories. The cost, including furnishing, is estimated at 2,500*l.*, and the architects are Messrs. Watson & Salmond, of Glasgow.

SANITARY AND ENGINEERING NEWS.

SEWAGE SCHEME, WORCESTER.—The sewage disposal works in course of construction upon the west bank of the Severn, at Worcester, are to be completed by the end of next year. The scheme consists in intercepting the sewage in two disintegrating tanks, then discharging it by means of rotating distributors through filters, afterwards transmitting it through land to the river. At present Messrs. Beesley are doing the sewers leading up to the disposal works—and the other part of the work is being done under the supervision of the City Engineer, Messrs. Beesley's proportion of the work being estimated to cost 17,000*l.* to 18,000*l.*, and the Corporation's share 60,000*l.* or 70,000*l.* Messrs. Vale, of Stourport, Messrs. Brasier, of Bromsgrove, and the Nevile Engineering Company, Worcester, are the contractors, and the remainder of the work is done by the Corporation, which employs 100 to 200 men. The contract work is in charge of Mr. Read, and Mr. Stuart Cairk has charge of the administrative work.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—Mr. Val Myer has entered into partnership with Mr. J. W. Fair, architect, of 14, South-square, Gray's Inn. The practice will in future be carried on at 39, Furnival-street, Holborn, E.C., under the style of "Fair & Myer."——Mr. John Cowan has resigned the managing directorship of the Stirling Boiler Co., Ltd., of Motherwell, and 25, Victoria-street, Westminster. The directors have appointed Mr. E. G. Constantine, A.M.Inst.C.E., of Manchester, to be managing director, and he will enter upon his duties at Motherwell on January 1 next. Mr. Cowan still retains his interest in the company, and will continue to be chairman of the directors.

MEMORIAL WINDOW, STRETTON SUGWAS.—At the Church of St. Mary Magdalene, Stretton Sugwas, near Hereford, on the 4th inst., the Bishop of Hereford unveiled an east window erected to the memory of the late Rev. Preb. Ashley. The work was executed by Messrs. James Powell & Sons, London.

COAL PRODUCTION.—We recently (October 28) gave some statistics relating to the output and export of coal in regard to this country, as shown by the returns from mines and quarries, but the coal tables just published as a Parliamentary paper contain very interesting figures in reference to foreign production. The total coal production of the world is given as 790 million tons of 2,240 lb., exclusive of lignite, this figure being the same as in the returns last year. To this gigantic total this country contributes 232,428,000 tons, and the United States 314,563,000 tons, or the United Kingdom nearly a third and the United States rather over a third, but in this country this bears the proportion of nearly 5¼ tons per head of the population, as against under 4 tons in the United States. We, in company with Germany, have produced a record amount of coal in 1904, France, Belgium, and the United States showing a slightly diminished output. The average value of coal produced is lowest in the United States, 6s. 7d., as against 7s. 8d. in this country, 8s. 7¼d. in Germany, 10s. 4¼d. in Belgium, 11s. 3½d. in France. The consumption of coal in this country seems nearly stationary as compared with the two previous years, but Germany shows a large increase, as also to a less degree France. For locomotives the railway companies use 11,445,364 tons in this country, the tables showing a small increase since 1902. We dealt with the exports from this country in our former Note, but it is interesting to observe that our import is only 3,000 tons, whilst Germany imports 7,975,000 tons, exporting 21,601,000 tons; the United States imports 1,621,000 tons, exporting 8,574,000 tons; the excess of exports from this country being 65,819,000 tons, as compared with 13,656,000 tons in Germany, and 6,953,000 tons in the United States.

NEW WORKHOUSE AND INFIRMARY, WORMWOOD SCRUBS.—We omitted in describing this building in our last, to give the name of the general contractor, Mr. Thomas Rowbotham, of Birmingham. In the printed record sent to us a list of the firms employed was given, the name of the general contractor being omitted there; hence our oversight.

THE CROYDON ACCIDENT.—Dr. T. Jackson, coroner for Croydon, held an inquiry on the 8th inst. as to the cause of death of a foreman bricklayer named Henry Wilson, forty-two, who was killed on Tuesday last week by the collapse of a wall on the site of the new Variety Theatre at Croydon, for the construction of which Mr. Wallis, of Balham, is the contractor. Nine other persons were injured in the accident. The wall which fell was a part of the old building erected in 1894, and had been left standing to be embodied in the new theatre. The jury, after deliberating half an hour, returned a verdict of accidental death, with a rider that the majority of them regretted that more precautions in the way of shoring up were not taken.

SCHOOL BOARD ARCHITECT, DUNDEE.—The duties and emoluments of Mr. James H. Langlands, Dundee School Board architect, have for some time engaged the consideration of the Board. A special committee deputed to deal with the matter deliberated upon it, and in the end drafted the following minute for presentation to the Board:—(1) That the existing arrangement with Mr. James H. Langlands should cease on December 31 current; that he be appointed architect to the Board during their pleasure for the erection of new schools and additions or alterations to existing schools exceeding in estimated cost the sum of 500*l.*, at a rate of commission on the cost of the building exclusive of the cost of the ground and the school furniture, in the case of new schools of 2½ per cent., and for alterations or additions as aforesaid of 3½ per cent. . . . (2) That a measurer be appointed for the Board to prepare schedules of quantities for all new schools and extensive alterations as aforesaid, and to measure up all such work and any work that may be specially assigned to him under the instructions of the Board, on its completion, at a commission of 1 per cent. on the total cost of the work, including the preparation and issue of schedules. This fee, it is stipulated, shall not be included in the schedules issued to contractors, and a statement thereof shall be submitted and paid direct by the Board. (3) That a separate clerk of works be appointed, to give his whole time to the service of the Board. . . . (4) That the new arrangement be brought into operation on January 1, 1906. . . .

ACADÉMIE DES INSCRIPTIONS ET DES BELLES LETTRES.—Mr. Arthur Evans, keeper of the Ashmolean Museum, Oxford, and Mr. Barclay Head, keeper of the Department of Coins and Medals, British Museum, have been elected corresponding members of this Académie.

REPAVING OF LINCOLN'S INN-FIELDS. — A deputation from Lincoln's Inn-fields attended the meeting of the Holborn Town Council on Wednesday for the purpose of presenting a petition to the Mayor and Corporation requesting the repaving of the roadway with "silent material" in place of the noisy granite "setts" of ancient date and very uneven surface. The deputation consisted of representatives of various firms having premises in Lincoln's Inn-fields. Mr. G. Lawrence Stewart (Messrs. Lee & Pembertons) referred to the extreme desirability of the request of the petitioners being complied with, as the noise made by the heavy traffic on the roadway was very great, and most disturbing to the many professional firms occupying offices in the locality. The petition was received by the Council and unanimously referred to the Streets Committee for consideration.

AVENUE THEATRE.—Mr. Fenwick, sitting at Bow-street, has granted an order for the taking down of the external walls of the theatre fronting Northumberland-avenue, Victoria-embankment, and Brewer's-lane, and adjoining No. 23, Craven-street, and of portions of the internal walls and of the roofs over the stage and auditorium where rendered defective by the recent catastrophe at Charing-cross railway station. The summons was taken out at the instance of the London County Council, under the Dangerous Structures Act. At the time of the accident the theatre was being re-constructed by Messrs. Patman & Fotheringham, for Mr. Cyril Maude, under the directions and superintendence of Mr. Detmar Blow. It was originally built in 1881-2, after F. Fowler's plans and designs, by Messrs. Kirk & Randall, who used corn-grit and bottom-bed from the Corsham Down quarries for the stone-work. The late Metropolitan Board of Works had at first required that the new buildings in Northumberland-avenue and the near vicinity should be faced with Portland stone.

A NEW ROAD, WEST MIDDLESEX.—A syndicate of promoters will seek for Parliamentary powers to enable them to supplant the present narrow main road through Brentford to Hounslow with a new road 100 ft. wide. The proposed line of route begins from the high road near Kew railway station, and, making a detour of the north of Brentford, crosses the river Brent and Boston-road, and so continues by Syon Hill to a junction near Spring-grove, Isleworth, with the high road westwards. The scheme provides for a widening of the main road between Pears' Fountain and Hounslow, and for obtaining sufficient land to secure recoupment out of the enhanced value of property along the new road.

NEW YORK SUBWAY.—The first year of operation of the New York subway was completed in October, and from the report on the year's working we learn that the total number of passengers amounted to 106,000,000 during that period, making an average of 300,000 passengers per day. As the elevated railways of the city carried about 717,000 passengers a day, the grand total is over 1,000,000 passengers a day on the two systems. One serious objection to the subway, which has not been without effect upon the summer traffic, is the excessively high temperature developed in hot weather. This condition is stated to be due partly to the heat given off by the electric motors of the trains, and partly to the constant application of the car brakes. The heat thus produced is quite welcome in cold weather, but during the summer months it renders the subway almost unbearable. The engineers fully realise the importance of making provision for dispersing the excess of heat, and we understand that they are now engaged in preparing a scheme of mechanical ventilation which, it is hoped, will furnish an effective remedy for the one serious defect of the new underground railway.

PRIVATE BILLS FOR NEXT SESSION.—The number of Private Bills to be introduced in the course of the ensuing session of Parliament, and of which the plans, etc., have been formally deposited in the Private Bill Office, amounts to 222. Of that total thirty-four sets relate to railways, twelve to tramways, sixty-two to miscellaneous projects, and 114 to provisional orders for electrical lighting, gas, water, and other undertakings. The total last year amounted to 224 sets of plans.

Legal.

ACTION BY A BUILDER.

THE hearing of the case of Cooper *v.* Lanning commenced before Mr. Justice Channell, sitting without a jury, in the King's Bench Division on the 7th inst., an action by the plaintiff, Mr. Henry Cooper, a builder, against the defendant, the building owner, to recover 430*l.* 19s. 2d., certified as due to him by the defendant's architect.

Mr. Duke, K.C., and Mr. Norman Craig appeared for the plaintiff, and Mr. English Harrison, K.C., and Mr. G. A. Scott for the defendant.

Mr. Duke, in opening the case, said that the defendant's answer to the claim was that there was no such contract as alleged, and that the architect had no power to certify as he had done. That was the first question for decision. Then the defendant set up a counter-claim in which he said that it was part of the consideration of his employing the plaintiff as his builder that plaintiff should grant him a right of way across an adjoining plot of land. Plaintiff said in answer to that that he was not satisfied it was an enforceable contract, although he admitted that he did promise to grant the right of way, and had never refused to grant it. Those were the matters in dispute, and under an order of June 7 last they had been directed to be tried before any other questions in the action. The position was as follows:—In the early part of 1902 defendant bought a plot of land at Maidenhead, which was a middle plot, between other plots of the same owner—a Mr. Nicholson. Defendant called in a Mr. Davy, of the firm of Davy & Salter, architects, of Maidenhead, and, on defendant's instructions, Mr. Davy negotiated with Mr. Nicholson for a right of way, but he ultimately gave up this

negotiation. It was then that the plaintiff was asked whether he would grant the right of way if he was employed to carry out the building operations for the defendant. Plaintiff said that if he was in a position to do so he would. Messrs. Davy & Salter prepared a specification and a bill of quantities. That was in November, 1902, and the plaintiff was asked to tender. The form of tender was material. His lordship would see that what the builder tendering was required to do was "to undertake to execute the works required to be done in erecting the above-mentioned residence, stable, and greenhouse, to the true intent and meaning of the plans, specifications, and conditions of contract as prepared by you"—that was to say, the architect, "for the undermentioned sums," and then the tenderer had to deal with the three items separately. The plans were in existence when the tenders were issued in the beginning of 1903. The conditions of the contract were on a printed form in common use in the architects' business. These conditions were shown to the defendant, and the plaintiff was familiar with them.

Mr. English Harrison: My case is that they were never shown to the defendant at all.

Mr. Duke replied that he should call evidence as to that. The plaintiff was one of four persons invited to tender. His tender was too high, but the defendant and the architect were agreed that it was better, if possible, to employ the plaintiff, and asked him to reconsider the amount of his tender. Plaintiff did so, and reduced it. Defendant had made a note on it that it was the amended tender of the plaintiff, so that that was a document well in the defendant's knowledge. All the tenders were before the defendant, because he prepared a list of them. Defendant then authorised the architect to employ the plaintiff, and he employed him on the terms of his tender, and he made it clear to the defendant that the thing would be carried out by a further document. Thereupon, at the beginning of February the architect authorised the plaintiff to begin work on the house and conservatory, but he reserved the question whether the work on the stable should proceed or not, because the matter of the right of way had not then been settled. On March 6 the architect called on the plaintiff to sign the agreement, which was the document referred to in the tender, and the plaintiff signed it and the architect verified it with his signature as representing the defendant. The work went on, and from time to time the architect gave certificates for the money which became due under the terms of the contract.

In answer to his lordship, Mr. English Harrison stated that what they wanted was to understand the contract. There was a question as to defective work, but that matter it had been agreed should go to an arbitrator. They would not trouble his lordship with that.

Mr. Duke, continuing, said that the defendant paid on the interim certificates of the architect up to 1,200*l.*, or about three-fifths of the total amount of the contract work. The matter was completed in the autumn of 1903, and the defendant went into occupation of the house and conservatory. In December defendant got some alternative plans for the stables, and in 1904 he got other estimates and plans for other things, but in the following March he had some disagreement with the architect. Plaintiff then sent in his account for the balance of the sum due to him to the architect, and the latter sent it on to the defendant on April 14, and certified it as being correct. On April 16 the defendant called on the plaintiff and entered into an exasperating conversation about other matters. Defendant asked plaintiff why he had not granted him the right of way, and said that his belief was that he was not going to grant it. Plaintiff had only about two days before got the conveyance of his land, and told the defendant so, and said, "Will you find anybody in Maidenhead to say that I won't stand by my word?" Defendant went away in a huff, and then a letter was written by the plaintiff which defendant construed as a refusal by him to grant the right of way. As soon as the plaintiff made a claim for payment on the architect's certificate defendant launched his counter-claim about the right of way.

The plaintiff was then called and gave evidence generally bearing out the statement of counsel.

When the hearing was resumed on Monday Mr. Duke, addressing his lordship, said that if he would give Mr. English Harrison and himself a few minutes they might be able to shorten the case a good deal.

His lordship assented to this, and after a consultation between counsel and the parties, Mr. Duke stated that it would not be necessary to occupy his lordship's time further with the dispute. He thought the case was settled, although it might be that they would want the judge's order. If so, perhaps his lordship would allow it to be on the terms as drawn up.

His lordship agreed to this.

Mr. English Harrison said that the defendant made no charge against the plaintiff's competence as a builder or against his personal integrity.

ACTION BY THE SILICATE PAINT COMPANY AGAINST PAINTER AND DECORATOR.

THE case of *In re* the Silicate Paint Company—J. B. Orr & Co., Ltd., *v.* Smith came before Mr. Justice Warrington in the Chancery Division on the 12th inst.

Mr. Bowden, K.C., and Mr. Sebastian appeared for the plaintiffs, and Mr. George Cave, K.C., and Mr. Stokes for the defendant.

Mr. Bowden, in opening the case, said the plaintiffs claimed damages from the defendant for the alleged wrongful passing off of another paint as and for the plaintiffs' paint. The plaintiffs were the owners of a paint called "Duresco." They also had a registered trade mark, of which that name formed part. One of the chief merits of the plaintiffs' paint was that it could be washed and was very durable. The reputation and value of the plaintiffs' paint was admitted. Mr. Smith, the defendant, was a painter and decorator of some standing in Bury, in Lancashire, and he had been a customer of the plaintiffs' for many years. The plaintiffs had reason to believe that it was not an uncommon thing where a specification required "Duresco" paint to be supplied and used that the parties tendering and contracting for the work had substituted inferior paint without any knowledge on the part of the employers. The plaintiffs had already obtained a verdict against persons who supplied inferior paint for "Duresco," and in the present case they complained of an inferior paint called "Freskel," which defendant had supplied in two specific cases. The first case related to the work done by the defendant in the summer of 1904 at the Hall of the Society of Textile Operators in Bury. A specification was prepared in that case which provided that "Duresco" should be used. He should call the President of the Society, who would say that they attached importance to "Duresco" being used because they had had previous experience of it, and found it a very good paint. The defendant substituted "Freskel," and his defence was that he had permission to do so. The plaintiffs had reason to think that their paint was not being used, and they sent down to the hall where the work was being done, and applied the water test, and they found that "Freskel" had been used instead of "Duresco." In this matter the short point would be whether the defendant had permission, as he alleged, to substitute "Freskel." The defendant said in his affidavit that his foreman obtained such permission. The other complaint related to some work done by the defendant at the Technical Schools at Bury for the Corporation. In that matter the specification specified that "Duresco" should be used, and the defendant contracted to do the work in compliance with the specification. The Corporation Surveyor and borough inspector had charge of the work, and defendant said that they had authority to use "Freskel." If that was right it would put an end to the plaintiffs' case. Apparently "Freskel" was used because it was cheaper than "Duresco," and because it went a little further, but it was not nearly so durable, as it could be washed off. The plaintiffs therefore claimed the relief usually granted in a "passing-off action."

Mr. William Nabb, President of the Society of Textile Operatives, examined, said he never assented to the substitution of "Freskel" for "Duresco." He had no power to do so. He did not know it was being substituted until the plaintiffs' representatives visited the building.

Cross-examined.

He had never called on the defendant to do the work over again, and no correspondence had passed between the society and the defendant before the action to his knowledge. They had intended to write, but hearing that the plaintiff company were going to take action they thought it was quite enough.

Mr. John Duckworth, secretary of the Textile Operatives Society, gave similar evidence.

Mr. A. W. Bradley, Surveyor of the Borough Corporation, examined, said that when he found that "Freskel" was being substituted in the Technical Schools he wrote to the defendant that "Duresco" was specified, and that they must have it. Subsequently he met the defendant, who told him that the change was not made for the sake of cheapness, and spoke of the good qualities of "Freskel," and mentioned work he had been doing at the Conservative Club. Witness went to the Conservative Club to examine the work, and saw Mr. Smith there, but he gave him no permission to substitute anything for "Duresco," and Mr. Smith did not ask for permission. He then instructed Mr. Faraday, the borough building inspector, to have one room done with "Freskel" and one with "Duresco," so as to make a comparison before any further work was done. This was done, but Mr. Faraday must have misunderstood his instructions, because the whole of the work was concluded, "Freskel" being used, without his being notified. He had intended to examine the two rooms before giving instructions how the remainder of the work should be done.

Cross-examined.

In his opinion "Freskel" was the more artistic of the two. He told Mr. Faraday that he did not dislike the appearance of the walls. He did not think that there was any intention on the part of the defendant to deceive him.

Mr. John Faraday, examined, said he saw the work in progress at the Technical Schools, and asked what was being put on the walls. He was told that it was "Freskel." He replied that it ought to have been "Duresco." He did not remember giving any permission to use "Freskel," but presumed that he had not ordered the work to be stopped. The school had to be opened on a certain date, and he did not want the job delayed.

This being the plaintiffs' case evidence was given by Mr. Robert Smith, who said that there was no difference in cost in the two articles. On his first visit to the work he found that "Freskel" was being used. His foreman gave him a satisfactory explanation. After that he had nothing personally to do with the work. Subsequently he had a conversation with Mr. Nabb and Mr. Duckworth, but could not say whether anything was said about the use of "Freskel." He had no intention of deceiving anyone, and it made not a farthing difference to his profit whether one paint was used or the other.

Cross-examined.

He had personally very little to do with this work. He thought it was of very small importance whether "Freskel" or "Duresco" was used on the work, one being as good as the other. He usually left it to his foreman to see that the materials used were according to specification. In this case the foreman told him that he had authority to use "Freskel."

Mr. Thos. Shepherd, the defendant's foreman, gave evidence as to having a conversation with Mr. Duckworth while the scaffolding was being put up in the hall of the Society of Textile Operatives. Mr. Duckworth asked him what they were doing the Technical Schools with, and what it would cost. Witness told him that it was "Freskel," and that the cost was about the same as "Duresco." Mr. Duckworth said he liked it very much, and it was immaterial to him what was put on so long as it would look as well and be as durable.

In the result his lordship, in giving judgment, said he believed the evidence of the last witness. He saw no case of passing off, and therefore entered judgment for the defendant with costs.

PATENTS OF THE WEEK.

APPLICATIONS PUBLISHED.*

21,233 of 1904.—F. N. REAVELL: *Manufacture of Artificial Stone.*

This relates to the manufacture of artificial stone, and consists in mixing Portland cement with fine gravel, which may consist of either crushed granite, slag, crushed stone, or other similar substance. After the material has been crushed so that it would pass a mesh, say, of three-eighths of an inch, it is delivered into a bunker, through which passes the conveyor which takes the gravel to the top of a vertical cylindrical tube.

24,459 of 1904.—A. W. ADAMS: *Door Springs and Checks.*

This relates to a door-closing device and comprises a pivot formed with cams, a pair of leavers pivoted in the casing, and a spring exerting pressure between the ends of said levers.

29,615 of 1904.—W. J. GEORGE: *Sinks and the like.*

This relates to sinks and the like formed with inwardly sloping top edges, the same at front and back, and overlapping the body part of the sink or the like, and consists of an ebonite or other suitable washer fixed round the outlet.

5,898 of 1905.—J. REED and A. H. SUTTON *Ball or Float Valves to Facilitate Repairs.*

This relates to a horizontally acting ball or float valve, and consists of the provision on the valve barrel of open hook-like lugs, and on the ball lever two journals or trunnions, by which journals or trunnions the ball lever is hooked to the valve barrel, the said levers being suspended in the lugs.

18,026 of 1905.—J. TYLOR & SONS, LTD., and T. H. APPLEBY: *Overflows to Lavatory Basins, Sinks, Baths, and the like.*

This relates to overflows for lavatory basins, sinks, baths, and the like, having open topped overflow passages, and consists in the employment of a grid hinged to a locking bracket furnished with a screw threaded bolt for attachment to the back of the basin, sink, bath, or the like.

2,363 of 1905.—C. H. OAKES, J. OAKES, C. R. OAKES, C. H. OAKES, junr., and T. SEARSON: *Carriers for Pipes, and the like.*

This relates to a carrier for transporting sanitary pipes, and the like, comprising a trough-shaped bed, preferably lined with suitable material, and mounted on a frame supported on wheels, arms

* All these applications are in the stage when opposition to the grant of Patents upon them can be made.

projecting out at right angles to the frame being provided at one end.

12,871 of 1905.—C. A. JARVIS and E. B. WATSON: *Apparatus for Supplying Measured Quantities of Liquid Disinfectant to Flushing Cisterns.*

This relates to an apparatus for delivering measured quantities of liquid disinfectant to flushing cisterns, and comprises a reservoir having a depending measure, which latter is alternately put in communication with said reservoir and with the flushing cistern, a slidable rod or spindle passing vertically through, and guided by the lid and cap respectively of the reservoir and the measuring vessel, a valve on said spindle to shut off communication between the reservoir and measuring vessel, the lower end of the spindle being for a sufficient length shaped so as to permit the flow of disinfectant from the measuring vessel into the flushing cittern when the valve shuts off communication with the reservoir, and a spring to normally retain the spindle and valve on their raised position.

14,279 of 1905.—P. P. WYGASCH and S. MEYER: *Press for Moulding Artificial Stone Blocks.*

This relates to a press for moulding artificial stone blocks, and consists in the movable knives being mounted in groups upon common spindles on opposite sides of the box, rack bars engaging said spindles, and having their toothed portions facing one another in mesh, with a pinion actuated by a crank shaft.

14,693 of 1905.—S. R. DRESSER: *Means for Stopping Leaky Bell and Spigot Pipe Joints.*

This relates to means for stopping leaky bell and spigot joints, and is characterised by a clamping packing ring, preferably of square or diamond shape, having a central aperture to engage the spigot end of a pipe section, and on one face a packing recess surrounding said aperture, the other face being cored out to form inner and outer flanges connected at intervals by webs, the said ring being formed in two parts, having overlapping portions, with registering bolt-holes and interlocking studs and recesses eccentric thereto, and bolt-holes in each part between the registering bolt-holes, a second ring formed of the parts carrying a central aperture to engage the exterior of the bell end of a pipe section, and also having registering bolt-holes with intermediate bolt-holes, one of the overlapping portions of each part having lateral webs, between which the overlapping portions of the other part fit, a packing ring for the packing recess of the former ring, together with clamping nuts and bolts for connecting the two rings.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

December 4.—By FRYER, COOPER, & Co.

Caledonian-road.—34 and 36, Gifford-st., u.t. 38½ yrs., g.r. 12*l.*, w.r. 122*l.* 4*s.*	£455

By TAYLOR, LOVEGROVE, & Co.

Anerley.—Selby-rd., f.g. rents 20*l.*, reversion in 60 yrs.	460

By HARRY SMITH (at Brighton).

Hurstpierpoint, etc., Sussex.—One-sixth share of Lock's Estate and Povey's Farm, 180 a. 3 r. 15 p., f. and c., y.r. 507*l.* 11*s.*	1,200

Dec. 5.—By CHINNOCK, GALSWORTHY, & Co.

City.—4, Godliman-st. (s.), area 430 ft., f., y.r. 90*l.*	2,400

By RUTLEY, SON, & VINE.

Holborn.—22, Red Lion-st. (s.), *l.*, w.r. 213*l.* 4*s.*	2,000
Bethnal Green.—107 and 109, Coventry-st., 3 and 4, Coventry-pl., area 1,400 ft., f., w.r. 65*l.*	415
Holloway.—2, 4, 6, and 8, Everleigh-st., u.t. 57½ yrs., g.r. 12*l.* 12*s.*, y.r. 107*l.*	1,050
Haverstock Hill.—14 and 16, Adelaide-rd., u.t. 34 yrs., g.r. 11*l.*, y.r. 90*l.*	700

By FREDK. WARMAN.

Holloway.—87, Windsor-rd., u.t. 47 yrs., g.r. 5*l.* 10*s.*, e.r. 36*l.*	610
126 and 128, St. John's-rd., u.t. 65 yrs., g.r. 15*l.*, y.r. 76*l.*	645
Fulham.—Purcell-cres., etc., f.g. rents 130*l.* 2*s.* 6*d.*, reversion in 63 yrs.	2,890
Stratford.—9, Temple Mill-la., f., w.r. 24*l.* 14*s.*	225
Bowes Park.—36 and 38, Russell-rd., u.t. 76 yrs., g.r. 12*l.*, w.r. 65*l.*	370
Tottenham.—417 and 419, West Green-rd., u.t. 61½ yrs., g.r. 15*l.*, w.r. 72*l.* 16*s.*	300

By J. & W. JOHNSON & Co. (at Masons' Hall Tavern).

Kingsland.—Boleyn-rd., The "Fox." p.h. u.t. 10 yrs., y.r. 120*l.* (with goodwill)	680

December 6.—By CARTWRIGHT & ETCHES.

Pimlico.—70, Grosvenor-rd., u.t. 28 yrs., g.r. 9*l.*, y.r. 60*l.*	475

By FOSTER & CRANFIELD.

Holborn.—22, Devonshire-st. (business premises), area 1,040 ft.; f., p.; also 7 and 7½ Boswell-ct. (business premises), area 2,000 ft., u.t. 44½ yrs., g.r. 40*l.*, p.	2,030
Acton.—18 to 26 (even), Richards-cottages, f., w.r. 104*l.*	950
Ealing.—1, 2 and 3, Green Man-ter. (s.), u.t. 75½ yrs., g.r. 4*l.* 10*s.*, y.r. 300*l.*	5,985

By WM. HOLLIS.

Hendon.—Sunny-gdns., "Lochryan," *f.*, e.r. 45*l.*	790

By NORRIS & HADLEY.

Reversion to equity of redemption of 107 to 113 (odd), Elgin-av., and 131, Shirland-rd., Paddington, u.t. 75 yrs., g.r. 50*l.*, y.r. 355*l.*, life aged 68	350

By MARK, LIELL, & SON.

Battersea.—343 to 351 (odd), Queen's-rd., u.t. 72½ yrs., g.r. 25*l.*, y.r. 225*l.*	£2,475
Peckham.—72, Bellenden-rd., u.t. 71 yrs., g.r. 4*l.* 10*s.*, e.r. 35*l.*	320
Plumstead, Kent.—2, 4, 6, and 8, Palmerston-rd., *f.*, w.r. 83*l.* 4*s.*	930
Woolwich, Kent.—3, Woodville-st., *f.*, y.r. 25*l.*	350

December 7.—By FULLER & FULLER.

Wood Green.—Lordship-la., a corner plot of freehold land	150

By HOPKINS & Co.

Holloway.—103, Lady Margaret-rd., u.t. 63 yrs., g.r. 8*l.* 15*s.*, e.r. 55*l.*	525

By STIMSON & SON.

Hackney.—214, 216, 218, and 222, Wick-rd., *f.*, w.r. 119*l.* 12*s.*	1,055
Camberwell.—23, Chiswell-st., and yard and stabling, etc., *f.*, y.r. 60*l.*	450
Stepney.—31 and 33, Samuel-st., c., w.r. 46*l.* 16*s.*	425
Catford.—59, Holbeach-rd., *f.*, e.r. 32*l.*	345
Tooting.—11, Defoe-rd., u.t. 58½ yrs., g.r. 8*l.*, y.r. 40*l.*; also 1 to 5, Garratt-la., u.t. 65 yrs., g.r. 15*l.*, w.r. 127*l.* 8*s.*	1,010
32, Defoe-rd., u.t. 63 yrs., g.r. 6*l.* 10*s.*, y.r. 36*l.*	330
Kennington.—2a, and 1 to 9, Lyric-pl., area 9,200 ft., *f.*, w.r. 163*l.* 2*s.*	1,280
231, 233, and 235, Kennington-rd., and 1, 2, and 3, Chester-mews, held subject to life aged 85, y.r. 192*l.* 4*s.*, with policies for 1,500*l.*	1,320

By S. WALKER & SON.

Paddington.—34, Warlock-rd., u.t. 57½ yrs., g.r. 7*l.*, e.r. 45*l.*	380
Tottenham.—6, 8, 10, and 12, Osman-rd., u.t. 71 yrs., g.r. 14*l.*, w.r. 83*l.* 4*s.*	220

By DANIEL WATNEY & SONS.

City.—12, 14, and 16, Bishopsgate-st. Within, area 1,820 ft., building lease for 80 yrs., let at per annum	2,100

December 8.—By GEO. HEAD & Co.

Highgate.—Millfield-la., f.g.r. 16*l.* 10*s.*, reversion in 5½ yrs.	1,760

By MAY & ROWDEN.

Regent-street.—13, 13A, and 13B, Great Marlborough-st. (building site), area 4,587 ft., *l.*	18,500

By A. ROBERTSON.

Wimbledon.—14, 16, and 18, Trinity-rd., *f.*, y.r. 105*l.*	1,505

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; l.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; h.h. for beerhouse; p.h. for public-house; o. for offices; s. for shops; ct. for court.

TO CORRESPONDENTS.

J. B. B. & Son (amounts should have been stated).

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications; and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples, sent to or left at this office, unless he has specially asked for them.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance. The Editor cannot undertake to read and consider articles offered for acceptance unless they are type-written.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

MEETINGS.

FRIDAY, DECEMBER 15.

Architectural Association.—Mr. W. H. Bidlake on "Church Towers and Spires," illustrated with lantern views. 7.30 p.m.

Institution of Mechanical Engineers.—(1) Adjourned discussion on the Seventh Report to the Alloys Research Committee on the "Properties of a Series of Iron-Nickel-Manganese-Carbon Alloys," by Dr. H. C. H. Carpenter, Mr. R. A. Hadfield (member), and Mr. Percy Longmuir; (2) paper to be read and discussed (if time permits), "Behaviour of Materials of Construction Under Pure Shear," by Mr. E. G. Izod. 8 p.m.

Junior Institution of Engineers (the Westminster Palace Hotel).—Paper on "Electrical Mains for Power Transmission Work," by Professor J. T. Morris, M.I.E.E. 8 p.m.

Institution of Civil Engineers (*Students' Meeting*).—Mr. E. E. Mann, B.Sc., on "Tests of Street Illumination in Westminster." 8 p.m.

SATURDAY, DECEMBER 16.

Junior Institution of Engineers.—Visit to the Electrical Engineering Works of Messrs. Johnson & Phillips, Old Charlton. 10 a.m.

MONDAY, DECEMBER 18.

Royal Institute of British Architects.—Messrs. Alexander Gascoyne and A. J. Dix on "Stained Glass." 8 p.m.

Society of Arts (Cantor Lecture).—Dr. J. A. Fleming on "The Measurement of High Frequency Currents and Electric Waves."—IV. 8 p.m.

TUESDAY, DECEMBER 19.

Architectural Association Camera and Cycling Club.—Mr. Francis Bond, M.A., on "Bay Design in the English Mediæval Churches." 7.30 p.m.

Institution of Civil Engineers.—Mr. H. A. Mavor on "Heat-Economy in Factories." 8 p.m.

WEDNESDAY, DECEMBER 20.

Builders' Foremen and Clerks of Works' Institution.—Annual Meeting of the Directors. 7 p.m.

Society of Arts.—Mr. C. L. Burdick on "The Aerograph Method of Distributing Colour." 8 p.m.

Edinburgh Architectural Association.—Mr. W. Findlay on "Electric Lighting and Wiring." 8 p.m.

Institution of Civil Engineers.—Students' visit to inspect the works in progress for the extension to Euston of the City and South London Railway. (Assemble at the site of the King's Cross Station, close to the Great Northern Hotel.) 2.30 p.m.

SATURDAY, DECEMBER 23.

Edinburgh Architectural Association.—Associates Annual Dinner.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£	s.	d.			
Hard Stocks	1	7	0	per 1000 alongside, in river.		
Rough Stocks and Grizzles	1	4	0	,,	,,	,,
Facing Stocks	2	0	0	,,	,,	,,
Shippers	2	0	0	,,	,,	,,
Flettons	1	5	6	,,	at railway depôt.	
Red Wire Cuts	1	11	0	,,	,,	,,
Best Fareham Red	3	12	0	,,	,,	,,
Best Red Pressed Ruabon Facing	5	0	0	,,	,,	,,
Best Blue Pressed Staffordshire	4	1	0	,,	,,	,,
Do. Bullnose	4	6	6	,,	,,	,,
Best Stourbridge Fire Bricks	3	15	6	,,	,,	,,
GLAZED BRICKS.						
Best White and Ivory Glazed Stretchers	12	0	0	,,	,,	,,
Headers	11	0	0	,,	,,	,,
Quoins, Bullnose, and Flats	16	0	0	,,	,,	,,
Double Stretchers	19	0	0	,,	,,	,,
Double Headers	16	0	0	,,	,,	,,
One Side and two Ends	19	0	0	,,	,,	,,
Two Sides and one End	20	0	0	,,	,,	,,
Splays, Chamferred, Squints	20	0	0	,,	,,	,,
Best Dipped Salt Glazed Stretchers, and Header	12	0	0	,,	,,	,,
Quoins, Bullnose, and Flats	14	0	0	,,	,,	,,
Double Stretchers	15	0	0	,,	,,	,,
Double Headers	14	0	0	,,	,,	,,
One Side and two Ends	15	0	0	,,	,,	,,
Two Sides and one End	15	0	0	,,	,,	,,
Splays, Chamferred, Squints	14	0	0	,,	,,	,,
Second Quality White and Dipped Salt Glazed	2	0	0	,,	less than best.	

	s.	d.		
Thames and Pit Sand	6	9	per yard, delivered.	
Thames Ballast	5	3	,,	,,
Best Portland Cement	26	0	per ton,	,,
Best Ground Blue Lias Lime	19	0	,,	,,

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime	11s. 0d. per yard, delivered.
Stourbridge Fireclay in sacks	27s. 0d. per ton at rly. dpt.

STONE.

	s.	d.	
BATH STONE—delivered on road waggons, Paddington Depôt	1	6½	per ft. cube.
Do. do. delivered on road waggons, Nine Elms Depôt	1	8½	,, ,,
PORTLAND STONE (20 ft. average)—			
Brown Whitbed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2	1	,, ,,
White Basebed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2	2½	,, ,,

	s.	d.		
Ancaster in blocks	1	10	per ft. cube, deld. rly. depôt.	
Beer ,,	1	6	,,	,,
Greenshill ,,	1	10	,,	,,
Darley Dale in blocks	2	4	,,	,,
Red Corsehill ,,	2	2	,,	,,
Closeburn Red Freestone	2	0	,,	,,
Red Mansfield ,,	2	4	,,	,,
YORK STONE—*Robin Hood Quality.*				
Scappled random blocks	2	10	,,	,,
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2	3	per ft. super.,	,,
6 in. rubbed two sides ditto, ditto	2	6	,,	,,
3 in. sawn two sides slabs (random sizes)	0	11½	,,	,,
2 in. to 2½ in. sawn one side slabs (random sizes)	0	7½	,,	,,
1½ in. to 2 in. ditto, ditto	0	6	,,	,,

STONE (continued).

		s.	d.	
HARD YORK—				
Scappled random blocks.	3	0	per ft.cube,deld.rly.depôt.	
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2	8	per ft. super.,	,,
6 in. rubbed two sides ditto	3	0	,,	,,
3 in. sawn two sides slabs (random sizes)	1	2	,,	,,
2 in. self-faced random flags	0	5	,,	,,
		s.	d.	
Hopton Wood (Hard Bed) in blocks	2	0	per ft. cube, deld. rly. depôt.	
,, ,, ,, 6 in. sawn both sides landings	2	7	per ft.super.deld. rly. depôt.	
,, ,, ,, 3 in. sawn both sides random slabs	1	0	,,	,,
,, ,, ,, 2 in. do.	0	8½	,,	,,

SLATES.

In. In.	£	s.	d.	
20×10 best blue Bangor	13	2	6	per 1000 of 1200 at r. d.
20×12 ,, ,,	13	17	6	,, ,,
20×10 first quality ,,	13	0	0	,, ,,
20×12 ,, ,,	13	15	0	,, ,,
16×8 ,, ,,	7	5	0	,, ,,
20×10 best blue Portmadoc	12	12	6	,, ,,
16×8 ,, ,,	6	12	6	,, ,,
20×10 best Eureka unfading green	15	17	6	,, ,,
20×12 ,, ,,	18	7	6	,, ,,
18×10 ,, ,,	13	5	0	,, ,,
16×8 ,, ,,	10	5	0	,, ,,
20×10 permanent green	11	12	6	,, ,,
18×10 ,, ,,	9	12	6	,, ,,
16×8 ,, ,,	6	12	6	,, ,,

TILES.

	s.	d.	
Best plain red roofing tiles	42	0	per 1000 at rly. depôt.
Hip and Valley tiles	3	7	per doz. ,,
Best Broseley tiles	50	0	per 1000 ,,
Do. Ornamental tiles	52	6	,, ,,
Hip and Valley tiles	4	0	per doz. ,,
Best Ruabon red, brown, or brindled do. (Edwards)	57	6	per 1000 ,,
Do. Ornamental do.	60	0	,, ,,
Hip tiles	4	0	per doz. ,,
Valley tiles	3	0	,, ,,
Best Red or Mottled Staffordshire do. (Peakes)	51	9	per 1000 ,,
Do. Ornamental do.	54	6	,, ,,
Hip tiles	4	1	per doz. ,,
Valley tiles	3	8	,, ,,
Best "Rosemary" brand plain tiles	48	0	per 1000 ,,
Best Ornamental tiles	50	0	,, ,,
Hip tiles	4	0	per doz. ,,
Valley tiles	3	8	,, ,,
Best "Hartshill" brand plain tiles, sand-faced	50	0	per 1000 ,,
Do. pressed	47	6	,, ,,
Do. Ornamental do.	50	0	,, ,,
Hip tiles	4	0	per doz. ,,
Valley tiles	3	6	,, ,,

WOOD.

BUILDING WOOD.	At per standard. £	s.	d.	£	s.	d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	13	10	0	15	0	0
Deals: best 3 by 9	13	0	0	14	0	0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11	0	0	12	0	0
Battens: best 2½ by 6 and 3 by 6	0	10	0	less than 7 in. and 8 in.		
Deals: seconds	1	0	0	less thn best.		
Battens: seconds	0	10	0	,,	,,	
2 in. by 4 in. and 2 in. by 6 in.	9	0	0	10	0	0
2 in. by 4½ in. and 2 in. by 5 in.	8	10	0	9	10	0
Foreign Sawn Boards—						
1 in. and 1½ in. by 7 in.	0	10	0	more than battens.		
¾ in.	1	0	0	,,		
Fir timber: best middling Danzig or Memel (average specification)	At per load of 50 ft. 4	10	0	5	0	0
Seconds	4	0	0	4	10	0
Small timber (8 in. to 10 in.)	3	12	6	3	15	0
Small timber (6 in. to 8 in.)	3	0	0	3	10	0
Swedish balks	2	10	0	3	0	0
Pitch-pine timber (30 ft. average)	3	5	0	3	15	0

JOINERS' WOOD.	At per standard. £	s.	d.	£	s.	d.
White Sea: first yellow deals, 3 in. by 11 in.	24	0	0	25	0	0
3 in. by 9 in.	22	0	0	23	0	0
Battens, 2½ in. and 3 in. by 7 in.	16	10	0	18	0	0
Second yellow deals, 3 in. by 11 in.	18	10	0	20	0	0
,, ,, 3 in. by 9 in.	17	10	0	19	0	0
Battens, 2½ in. and 3 in. by 7 in.	13	10	0	14	10	0
Third yellow deals, 3 in. by 11 in. and 9 in.	13	10	0	15	0	0
Battens, 2½ in. and 3 in. by 7 in.	11	0	0	12	0	0
Petersburg: first yellow deals, 3 in. by 11 in.	21	0	0	22	10	0
Do. 3 in. by 9 in.	18	0	0	19	10	0
Battens	13	10	0	15	0	0
Second yellow deals, 3in. by 11in.	16	0	0	17	0	0
Do. 3 in. by 9 in.	14	10	0	16	0	0
Battens	11	0	0	12	10	0
Third yellow deals, 3 in. by 11 in.	13	0	0	14	0	0
Do. 3 in. by 9 in.	12	10	0	14	0	0
Battens	10	0	0	11	0	0
White Sea and Petersburg—						
First white deals, 3 in. by 11 in.	14	10	0	15	10	0
,, ,, 3 in. by 9 in.	13	10	0	14	10	0
Battens	11	0	0	12	0	0
Second white deals, 3 in. by 11 in.	13	10	0	14	10	0
,, ,, 3 in. by 9 in.	12	10	0	13	10	0
,, ,, battens	10	0	0	11	0	0
Pitch-pine: deals	16	10	0	20	0	0
Under 2 in. thick extra	0	10	0	1	0	0
Yellow Pine—First, regular sizes	44	0	0	upwards.		
Oddments	32	0	0	,,		
Seconds, regular sizes	33	0	0	,,		
Yellow Pine oddments	28	0	0	,,		
Kauri Pine—Planks, per ft. cube	0	3	6	0	5	0

WOOD (continued).

JOINERS' WOOD (continued)—	At per standard. £	s.	d.	£	s.	d.
Danzig and Stettin Oak Logs—						
Large, per ft. cube	0	3	0	0	3	6
Small ,, ,,	0	2	6	0	2	9
Wainscot Oak Logs, per ft. cube	0	5	0	0	5	6
Dry Wainscot Oak, per ft. sup. as inch	0	0	8	0	0	9
¾ in. do. do.	0	0	7	—		
Dry Mahogany—Honduras, Tabasco, per ft. super. as inch	0	0	9	0	1	0
Selected, Figury, per ft. super. as inch	0	1	6	0	2	6
Dry Walnut, American, per ft. super. as inch	0	0	10	0	1	0
Teak, per load	17	0	0	22	0	0
American Whitewood Planks, per ft. cube	0	4	0	0	5	0
Prepared Flooring, etc.—	Per square.					
1 in. by 7 in. yellow, planed and shot	0	13	6	0	17	6
1 in. by 7 in. yellow, planed and matched	0	14	0	0	18	0
1¼ in. by 7 in. yellow, planed and matched	0	16	0	1	0	0
1 in. by 7 in. white, planed and shot	0	12	0	0	14	6
1 in. by 7 in. white, planed and matched	0	12	6	0	15	0
1¼ in. by 7 in. white, planed and matched	0	15	0	0	16	6
¾ in. by 7 in. yellow, matched and beaded or V-jointed brds.	0	11	0	0	13	6
1 in. by 7 in. ,, ,,	0	14	0	0	18	0
¾ in. by 7 in. white ,, ,,	0	10	0	0	11	6
1 in. by 7 in. ,, ,,	0	12	9	0	15	0
6 in. at 6d. to 9d. per square less than 7 in.						

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £	s.	d.	£	s.	d.
Rolled Steel Joists, ordinary sections	6	5	0	7	0	0
Compound Girders, ordinary sections	7	15	0	8	15	0
Steel Compound Stanchions	9	7	6	10	17	6
Angles, Tees, and Channels, ordinary sections	7	15	0	8	15	0
Flitch Plates	8	0	0	8	10	0
Cast Iron Columns and Stanchions including ordinary patterns	6	17	6	8	0	0

METALS.

	Per ton, in London. £	s.	d.	£	s.	d.
IRON—						
Common Bars	8	0	0	8	10	0
Staffordshire Crown Bars, good merchant quality	8	10	0	9	0	0
Staffordshire "Marked Bars"	10	0	0	—		
Mild Steel Bars	8	15	0	9	0	0
Hoop Iron, basis price	9	5	0	9	10	0
,, ,, Galvanised	17	0	0	—		
(*And upwards, according to size and gauge.)						
Sheet Iron Black—						
Ordinary sizes to 20 g.	9	10	0	—		
,, ,, 24 g.	10	10	0	—		
,, ,, 26 g.	12	0	0	—		
Sheet Iron, Galvanised, flat, ordinary quality—						
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	14	0	0	—		
Ordinary sizes to 22 g. and 24 g.	14	10	0	—		
,, ,, 26 g.	15	0	0	—		
Sheet Iron, Galvanised, flat, best quality—						
Ordinary sizes to 20 g.	17	0	0	—		
,, ,, 22 g. and 24 g.	17	10	0	—		
,, ,, 26 g.	19	0	0	—		
Galvanised Corrugated Sheets—						
Ordinary sizes 6 ft. to 8 ft. 20 g.	13	10	0	—		
,, ,, 22 g. and 24 g.	14	0	0	—		
,, ,, 26 g.	15	5	0	—		
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 30 g. and thicker	11	10	0	—		
Best Soft Steel Sheets, 22 g. & 24 g.	12	10	0	—		
,, ,, ,, 26 g.	14	15	0	—		
Cut Nails, 3 in. to 6 in.	9	10	0	9	15	0
(Under 3 in., usual trade extras.)						

LEAD, &c.

	Per ton, in London. £	s.	d.	£	s.	d.
LEAD—Sheet, English, 3lb. and up.	20	0	0	—		
Pipe in coils	20	10	0	—		
Soil pipe	23	0	0	—		
Compo pipe	23	0	0	—		
ZINC—Sheet—						
Vieille Montagne ton	33	0	0	—		
Silesian	32	15	0	—		
COPPER—						
Strong Sheet per lb.	0	1	0	—		
Thin ,, ,,	0	1	1	—		
Copper nails ,,	0	0	11	—		
BRASS—						
Strong Sheet ,,	0	0	11	—		
Thin ,, ,,	0	1	0	—		
TIN—English Ingots ,,	0	1	6½	—		
SOLDER—Plumbers' ,,	0	0	7½	—		
Tinmen's ,,	0	0	9½	—		
Blowpipe ,,	0	0	10½	—		

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2¾d. per ft. delivered.
,, fourths	2d. ,, ,,
21 oz. thirds	3¾d. ,, ,,
,, fourths	3d. ,, ,,
26 oz. thirds	4¾d. ,, ,,
,, fourths	3¾d. ,, ,,
32 oz. thirds	5¾d. ,, ,,
,, fourths	5d. ,, ,,
Fluted Sheet, 15 oz.	3¾d. ,, ,,
,, 21 oz.	4¾d. ,, ,,
¼ Hartley's Rolled Plate	2d. ,, ,,
⅜ ,, ,, ,,	2¼d. ,, ,,
½ ,, ,, ,,	2½d. ,, ,,
Figured and Oxford Rolled Oceanic white	4d. ,, ,,
,, ,, ,, tinted	5¼d. ,, ,,

OILS, &c.

		£	s.	d.
Raw Linseed Oil in pipes	per gallon	0	1	8
,, ,, ,, in barrels	,,	0	1	9
,, ,, ,, in drums	,,	0	1	11
Boiled ,, ,, in pipes	,,	0	1	10
,, ,, ,, in barrels	,,	0	1	11
,, ,, ,, in drums	,,	0	2	1
Turpentine in barrels	,,	0	3	10
,, in drums	,,	0	4	0

OILS, &c. (continued).

		£	s.	d.
Genuine Ground English White Lead	per ton	22	10	0
Red Lead, Dry	,,	21	0	0
Best Linseed Oil Putty	per cwt.	0	6	6
Stockholm Tar	per barrel	1	12	0

VARNISHES, &c.

	Per gallon. £	s.	d.
Fine Pale Oak Varnish	0	8	0
Pale Copal Oak	0	10	6
Superfine Pale Elastic Oak	0	12	6
Fine Extra Hard Church Oak	0	10	0
Superfine Hard-drying Oak, for seats of Churches	0	14	0
Fine Elastic Carriage	0	12	6
Superfine Pale Elastic Carriage	0	16	0
Fine Pale Maple	0	16	0
Finest Pale Durable Copal	0	18	0
Extra Pale French Oil	1	1	0
Eggshell Flatting Varnish	0	16	0
White Copal Enamel	1	4	0
Extra Pale Paper	0	12	0
Best Japan Gold Size	0	10	6
Best Black Japan	0	16	0
Oak and Mahogany Stain	0	9	0
Brunswick Black	0	8	6
Berlin Black	0	16	0
Knotting	0	10	0
French and Brush Polish	0	10	0

TERMS OF SUBSCRIPTION.

"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 19s. per annum (52 numbers) PREPAID. To all parts of Europe, America, Australia, New Zealand, India, China, Ceylon, etc., 26s. per annum.

Remittances (payable to J. MORGAN) should be addressed to The Publisher of "THE BUILDER," Catherine-street, W.C.

SUBSCRIBERS in LONDON and the SUBURBS, by prepaying at the Publishing Office 19s. per annum (52 numbers) or 4s. 9d. per quarter (13 numbers), can ensure receiving "The Builder" by *Friday Morning's Post.*

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.* [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

BEDFORD.—For 316 lineal yds. of 18-in. diameter pipe sewer, etc., in Elstow-road, for the Town Council. Mr. N. Greenshields, Borough Surveyor, Town Hall, Bedford:—

J. Jackson	£661	H. G. Willmot, Rushden*	£626
F. Ray	647		

[Borough Engineer's estimate, £627.]

BIRTLEY FELL.—For roads, footpaths, foundations, etc., for Smallpox Isolation Hospital, for Chester-le-Street Rural District Council. Mr. J. H. Mole, Surveyor, Chester-le-Street. Quantities by Surveyor:—

E. R. Davison	£666 0 0	J. Oakes	£535 0 0
Thompson & Son	650 12 2	F. W. Jefferson	521 0 0
L. Jobling	602 4 8	J. M. Wright	518 10 8
W. Arnell	556 0 0	J. Lant	496 10 0
R. Bruce	557 10 3	R. Thompson	391 10 0
Exors. of J. Arundel	547 12 6	J. Burnett, Birtley*	419 4 0

BOLTON-UPON-DEARNE.—For private street works, Whitworth-street, Whitworth-street (continued), Elizabeth-street, and two back roads, for the Urban District Council:—

C. Sprakes & Son	£975 0 0	J. Holmes & Son	£548 10 1
J. Brook	910 3 0	J. Moran, 31, Fitzwilliam-street, Sheffield*	559 10 0
S. Hamilton	655 10 0		
W. Johnson	651 0 0		
H. Ellison	647 2 11½		
G. Hall & Co.	575 3 7		

CARDIFF.—For alterations and additions to premises in Canton, for Mr. Donald Knight. Mr. E. G. C. Down, architect and surveyor, 31, High-street, Cardiff. Quantities by architect:—

F. Ashley	£499 12 9	Gough Bros.	£425 0 0
W. Thomas & Co.	497 0 0	Knox & Wells	423 10 0
H. W. North	466 0 0	G. Hallett	409 16 0
D. Davies & Sons	465 0 0	E. Turner & Sons	407 0 0
S. Shepton & Son	463 10 0	G. Griffiths & Son	406 0 0
J. Gibson	450 0 0	A. Williams	400 0 0
J. S. Shepton	447 5 0	C. C. Dunn, Cardiff*	400 0 0
G. Cousens & Sons	442 0 0	F. Bond	368 0 0
F. Small	430 0 0		

CEFN.—For 450 lineal yds. of 9-in. stoneware pipe sewer, for Wrexham Rural District Council. Mr. J. Price Evans, C.E., Argyle-chambers, Wrexham:—

J. W. Harris	£232 10 2	J. T. Jones, Cefn Maur, nr. Ruabon*	£208 4 0

CONGLETON.—For workhouse water supply, for Congleton Rural District Council and Guardians and Sandbach Urban District Council. Mr. W. Wyatt, engineer, 99, Radford-road, Leamington:—

	Per Ton. £ s. d.
Water Pipes.	
Staveley Iron and Coal Co., Chesterfield	4 18 0
	4 16 0
	4 13 6

CRIEFF.—For Crieff new Post-office:—

		Credit Old Materials.
Boyd & Lonest	£4,553 0	—
MacLeish, Morrison, & Co., Ltd.	4,500 0	—
W. Ellis	4,352 0	£5 5
J. Stothard & Sons	4,098 0	30 0
R. McRobbie	3,893 3	—

TENDERS—*Continued on page* 659.

COMPETITION, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, etc., still open, but not included in this List, see previous issues.)

COMPETITION.

Nature of Work.	By whom Required.	Premiums.	Designs to be delivered
*EXTENSION OF MUNICIPAL BUILDINGS	Birmingham Corporation.....	105/.....	Mar. 31

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, etc., supplied by	Tenders to be delivered
Penge.—Wood Paving, Anerley-road	Penge U.D.C.	H. W. Longden, Surveyor, Town Hall, Anerley, S.E.	Dec. 19
Poundsbridge, etc., Penshurst.—Post and Rail Fence	Sevenoaks R.D.C.	W. H. Bolt, Surveyor's Office, Leigh, Tonbridge	do.
Manchester.—One Group of 3 Transformers	Manchester Electricity Committee..	F. E. Hughes, Electricity Department, Town Hall, Manchester ..	do.
Manchester.—Switchboards	do.	do.	do.
Salford.—Paving, etc., Twenty-nine Streets	Salford Corporation	Borough Engineer's Office, Town Hall, Salford.....	do.
Hertford.—Stoneware Pipe Surface Water Drains ..	Hertford Corporation	J. H. Jevons, Borough Surveyor, Hertford	do.
Bradford.—Painting	Bradford Corporation	City Surveyor, Town Hall, Bradford	do.
Vange.—Classroom at Council School.....	Billericay Advisory Sub-Committee	F. Whitmore, County Architect, Duke-street, Chelmsford.....	do.
Laindon.—Additions to Infants' Room, etc.	do.	do.	do.
Houghton-le-Spring.—Drainage at Workhouse	The Guardians	J. W. Holbrook, C.E., Houghton-le-Spring	Dec. 20
Halifax.—Stores	Halifax Gasworks Committee	J. Wilkinson, Engineer, Gasworks, Halifax	do.
Cardiff.—107 yds. of Brick Sewer in New-rd., Canton	Cardiff Corporation	Mr. Harpur, City Engineer, Cardiff.....	do.
Swinton.—Concreting Floor of Dining Hall at School	Manchester Guardians	A. J. Murgatroyd, Architect, 23, Strutt-st., Manchester	do.
Redditch.—4,417 yds. of Stoneware Pipe Sewer	Redditch R.D.C.	B. Perrins, Surveyor, Council House, Redditch	Dec. 21
Bradford.—Retorts, Firebricks, etc.	Bradford Corporation	Gas Engineer, Town Hall, Bradford	do.
Worthing.—Alterations to Stables, Worthing Lodge	The Corporation	F. Roberts, Borough Engineer and Surveyor, Worthing.....	do.
Annan, N.B.—Buildings and Walls	Annan Gas Co.	Secretary's Office, 26, High-street, Annan.....	do.
Penryheolgerrig.—Mixed School for 250.....	Merthyr Tydfil Education Comm. ..	J. Llewellin Smith, Architect, Central Chambers, Merthyr Tydfil	Dec. 22
Dublin.—Stm.-Heating, Plumbing, etc., Fire Brig. Sta.	Dublin Waterworks Committee	City Architect, Municipal Buildings, Cork Hill, Dublin	do.
Fenton.—800 yds. of Fencing	Fenton U.D.C.	S. A. Goodall, Surveyor, Town Hall, Fenton, Staffs.....	do.
Exmouth.—40 tons of c.i. Main Pipes	Exmouth Gas Co.....	J. T. Foster, Secretary, Exmouth	do.
Southampton.—Altns., etc., to Moira House, above Bar	.....	Hair & Bucknill, Architects, Southampton	Dec. 23
Manchester.—Permanent Way Points, Tongues, etc.	Manchester Tramways Committee..	J. M. M'Elroy, Manager, Trmwys. Dept., 55, Piccadilly, Manchester	do.
Sligo.—Warehouse Premises	Messrs. H. Lyons & Co., Ltd.	Graeme-Watt & Tulloch, Architects, 77A, Victoria-street, Belfast..	do.
Clayton, near Bradford	North Brierley Guardians	J. Harper Bakes, Architect, Calverley-chbrs., Victoria-sq., Leeds	do.
Slough.—Pipes.....	Slough Gas and Coke Co.....	Manager of Works	Dec. 26
Elgin.—New Lodge at Cemetery	.....	J. Wittet, Architect, Elgin	do.
Elgin.—Toolhouse, Walls, and Railings at Cemetery	.....	do.	do.
Elgin.—Laying-out Grounds and Road-Making	.....	do.	do.
Elgin.—Water Supply at Cemetery	.....	do.	do.
Oxford.—Stores	Oxford Corporation	City Engineer's Office, Town Hall, Oxford.....	Dec. 27
Hemsworth.—Havercroft Drainage.....	Hemsworth R.D.C.	T. H. Richardson, Surveyor, Hemsworth, near Wakefield	do.
Salford.—Reconstruction of Two Bridges	Salford Building & Bridges Comm.	C. S. Allott & Sons, Engineers, 46, Brown-street, Manchester	do.
Leigh-on-Sea.—Making-up Streets	Leigh U.D.C.	W. J. Petch, Surveyor, Council Offices, Leigh	do.
Pontmorlais, Merthyr.—Hall, Vestries, etc.	Merthyr Forward Movement	A. Marks, Architect and Surveyor, Glebeland-street, Merthyr	do.
Lowestoft.—Mortuary on South Quay.....	The Corporation	G. H. Hamby, Borough Engineer, Town Hall, Lowestoft	do.
Rochdale.—Stores	Rochdale Canal Co.	C. R. Dykes, 80, Dale-street, Manchester	Dec. 28
*NEW POST-OFFICE, CARMARTHEN	Commissioners of H.M. Works, etc.	The Postmaster, Carmarthen	Dec. 29
Preston.—School in Roebuck-street.....	The Corporation	Education Offices, Lancaster-road, Preston	Dec. 30
Bocking, near Braintree.—Sinking Borehole, etc.....	Bocking Parish Council	E. H. Bright, Engineer, Dodd's Hall, Braintree	do.
*SMALL BRIDGE WITH APPCHS., BISHOPSTOKE	Southampton County Council.....	County Surveyor, The Castle, Winchester	Jan. 1
Chelmsford.—100 Tons of Rough Granite	Chelmsford Guardians	W. W. Duffield, 96, High-street, Chelmsford.....	do.
Abbeyleix.—Tower and Spire at Church.....	.....	W. H. Byrne & Son, Architects, 20, Suffolk-street, Dublin.....	do.
Widnes.—Brick and Puddle Gasholder Tank.....	Widnes Corporation	Isaac Carr, Engineer, Widnes	Jan. 2
Leyton.—Street Works	Leyton U.D.C.	W. Dawson, Surveyor, Town Hall, Leyton	do.
*HOT-WA. HEATER, ETC., BROOK-ST. INF. LAUN.	Lambeth Guardians	Guardians' Offices, Brook-street, Kennington-road, S.E.	do.
*NEW SORTING OFFICE AT FOREST HILL	H.M. Office of Works	H.M. Office of Works, Storey's Gate, Westminster, S.W.	do.
Totnes.—Fencing	Totnes R.D.C.	S. S. Rendle, Highway Surveyor, Hillside, Maridon-road, Paignton	Jan. 4
Grimsby.—Electrical Plant	The Corporation	W. A. Vignoles, Boro' Electrical Engineer, Elec. Works, Grimsby	Jan. 5
Llandilo.—Additions & Alterations to Council School	Carmarthenshire Education Com. ..	W. D. Jenkins, County Education Architect, Shire Hall, Carmarthen	do.
Bryndu —Additions & Alterations to Council School	do.	do.	do.
Brynamman.—Heating Apparatus, etc., Council Sch.	do.	do.	do.
Bettws.—Repairs to Council School	do.	do.	do.
Hillfield.—Ventila. & Fold. Partitions to Council Schl.	do.	do.	do.
Castle.—Ventilation, Lighting, etc., to Council School	do.	do.	do.
*SCHOOL, ARDWICK	Manchester Education Committee..	Education Offices, Deansgate, Manchester	Jan. 6
*WATER-TOWER IN BRICKWORK	Littlestone-on-Sea Water Co.	A. F. Phillips, Engineer, 38, Parliament-street, S.W.	do.
Gayton.—Additions to Infirmary.....	Freebridge Lynn Guardians	L. F. Eagleton, Architect, King-street, King's Lynn	Jan. 8
Gayton.—Drainage and Water Supply at Workhouse	do.	do.	do.
*WORKS AND MATERIALS	Wandsworth Borough Council	Council House, Wandsworth, S.W.....	do.
Clutton.—Alterations, etc., to Workhouse Infirmary	Clutton Guardians.....	W. F. Bird, Architect, Midsomer Norton, Somerset	Jan. 9
Clutton.—New Vagrant Wards	do.	do.	do.
Timber for Central South African Railways	Crown Agent for Colonies	Crown Agent, Whitehall Gardens, S.W.....	do.
*BOARD OF TRADE, ETC., OFFICES, SUND'LAND	H.M. Office of Works	H.M. Office of Works, Storey's Gate, Westminster, S.W.	Jan. 10
*EXTENSION OF PIER	Southsea Clarence Pier Co.	A. H. Bone, Engineer, 148, High-street, Portsmouth	do.
*WIRE GUARDS, ETC., BELMONT ASY., SUTTON	Metropolitan Asylums Board	Office of the Board, Embankment, E.C.	Jan. 11
*NEW TOWN HALL, LANCASTER	Lancaster Corporation	E. W. Mountford, Architect, 17, Buckingham-street, W.C.	Jan. 24
Ashchurch.—Sewage Disposal Works	Tewkesbury R.D.C.	H. A. Badham, Clerk, Tewkesbury.....	No date.
Lichfield.—Six Villas at Cherry Orchard.....	.....	G. W. Barrett, Architect, Chesterfield-road, Lichfield.....	do.
Cardiff.—Forward Movement Hall and Home	.....	W. H. Scott, Architect, Victoria-chambers, 18, Queen-street, Cardiff	do.
Guildford.—40 ft. Road, Harvey Hill to Pewley Hill	Poyle Charity Estate Trustees	W. G. Lower, Surveyor to Trustees, 12A, High-street, Guildford ..	do.
*ADDS., HORNCHURCH PK.-LA. SCHS., ROMFD.	Essex Education Committee	Office of the District Committee, 44, Eastern-road, Romford.....	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
*ASSISTANT INSTRUCTORS OF WOODWORK ..	London C.C.	100/. per annum	Dec. 23
*HEAD MASTER	Leeds Education Committee	200/	Dec. 31
*CLERK OF WORKS.....	Bucks Education Committee	Not stated	do.

TENDERS.—*Continued from page 657.*

COWLEY (Middlesex).—For new road and surface-water drains, for the Rural District Council. Mr. Edmund Birks, Engineer and Surveyor, Town Hall, Uxbridge:—

Thomas & Thomas	£1,049 0 0	W. S. Try	£746 19 9
T. Watson, Jun.	838 4 9	S. Gibbons	733 9 2
J. J. Ward & Son	810 0 0	Langley, Hardy, & Johnson	729 0 0
J. C. Trueman	796 0 0	T. Free & Sons, Maidenhead*	724 11 6
McGregor & Crook	781 12 0		

CROYDON.—For the erection of a school for 1,256 children, Winterbourne-road, Thornton Heath, for the Education Committee of the Croydon County Council. Mr. H. Carter Pegg, architect, of Thornton Heath. Quantities by Mr. F. Downing, Middle Temple, E.C.:—

Hughes & Stirling	£21,126 3 6	Johnson & Son	£18,602 0 0
C. Wall, Ltd.	20,294 0 0	Martin Wells, & Co., Ltd.	18,570 0 0
Marriott & Salter	20,050 0 0	Kerridge & Shaw	18,526 0 0
G. Everett	19,990 0 0	J. & M. Patrick	18,409 0 0
Dean & Co.	19,912 0 0	F. G. Minter	18,334 0 0
Bowen & Sons	19,837 0 0	E. J. Saunders	18,289 0 0
Bulled & Co.	19,797 0 0	Smith & Sons	17,983 0 0
Grace & Marsh	19,705 0 0	Spencer, Santo, & Co.	17,907 0 0
Jones & Andrews	19,641 0 0	Cann & Co.	17,848 0 0
Shelbourne & Co.	19,325 0 0	Wallis & Sons	17,760 0 0
Willcock & Co.	19,300 0 0	B. E. Nightingale	17,753 0 0
H. Kent	19,220 0 0	Gathercole Bros.	17,400 0 0
Norman & Burt	19,189 0 0	A. Faulks	17,286 0 0
Johnson & Co., Ltd.	19,171 0 0	Lawrence & Son	16,994 0 0
Oak Building Co.	18,985 0 0	Cook & Sons	16,930 0 0
Smith & Sons	18,888 0 0	Hudson & Co.	1,6877 6 6
Foster & Dicksee	18,888 0 0	Moss & Sons, Ltd., Loughborough*	16,760 0 0
Drowley & Co.	18,880 0 0		

DORKING.—For constructing 250 yds. of 9-in. stoneware pipe sewer, for the Urban District Council. Mr. G. Somers Mathews, Surveyor, 64, South-street, Dorking:—

Free & Sons	£251 14 0	Smith & Co.	£185 0 0
S. Redhouse	216 2 0	J. May	180 0 0
S. Atkins	202 5 0	Davies, Ball, & Co.	168 0 0
A. C. Soan	199 13 2	Dean & Co., Ltd., High Holborn*	147 0 0
F. W. Trimm	196 0 0		
R. W. Swaker	189 19 9		

[Surveyor's estimate, £200.]

EASINGWOLD (Yorks).—For 460 lineal yds. of 12-in. stoneware sewers, etc., for the Rural District Council. Messrs. Fairbank & Son, engineers, Lendal-chambers, York:—

Schofield, Sons, & Co., Ltd., Kirkstall-road, Leeds* £246 9 2

ENFIELD.—For new post-office:—

W. Pavey & Son	£5,725 0	Speechley & Smith	£4,395 0
J. Thomas	5,223 0	W. Lawrence & Son	4,384 0
L. & W. H. Patman	5,185 0	Press, Robinson, & Co.	4,346 0
F. & A. Willmott	4,984 0	A. Monk	4,312 0
R. Jackson	4,711 11	J. Jarvis & Sons	4,300 0
Rowley Bros.	4,576 0	Almond & Son, Ltd.	4,187 0
Thomas & Edge	4,567 0	Edwards & Medway	4,170 0
J. & M. Patrick	4,499 0	Allen, Fairhead, & Sons*	4,159 0
Mattock & Parsons	4,487 0	W. H. Hyde	4,092 0
Pollard & Brand	4,438 0		
B. E. Nightingale	4,429 0		
J. Cracknell	4,422 0		

ERITH (Kent).—For 3,000 yds. super. of cement indurated flag paving, for the Urban District Council:—

	Per super. yd. s. d.		
Sanitary Block, etc., Co., Ltd.	7 9	..	£1,162 10
Imperial Stone Co., Ltd.	5 0	..	750 0
Excelsior Patent Stone Co.	5 1	..	762 10
Adamant Stone, etc., Co., Ltd.	4 9	..	712 10
Abell & Cammell	4 9	..	712 10
Granite Flag Co., Ltd.	4 9	..	712 10
Shap Granite, etc., Co.	4 8	..	700 0
J. Ellis & Sons, Ltd.	4 8	..	700 0
Croft Granite, etc, Co.	4 8	..	700 0
Empire Stone Co.	4 8	..	700 0
Road Maintenance, etc., Co., Ltd.	4 7	..	687 10
Patent Victoria Stone Co., Ltd.	4 6	..	675 0
J. R. White & Co.	4 6	..	675 0
Atlas Stone Co., Ltd.	4 4	..	658 0
Gibson & Co.	4 4	..	650 0
Gibbs Bros.	4 3	..	637 10
Gamble Wood (Gibbs & Co.)*	4 2½	..	631 5
A. Walker & Son	3 11	..	587 0

GRAYS.—For 135 tons of scoriæ bricks, for the Urban District Council. Mr. A. C. James, surveyor, High-street, Grays:—

	per ton.
Westcoriæ Brick Co.	20s. and 21s.
Blichfeld & Co., 16, Water-lane, E.C.*	18s. 3d. and 20s. 3d.

GRAYS.—For 550 lineal yds. of 9-in. and 150 lineal yds. of 6-in. stoneware pipes, for the Urban District Council. Mr. A. C. James, surveyor, High-street, Grays:—

Albion Clay Co., Woodville*—9-in pipes, 1s. 4½d. per yd.; 6-in pipes, 9½d. per yd.; junctures, 2s. each. Less 2½ per cent.

GUILDFORD.—For forming about 1,100 ft. of road on Woodbridge Estate. Messrs. Houston & Houston, surveyors, 148, High-street, Guildford:—

Cunningham & Forbes	£1,697 0 0	S. Kavanagh & Co.	£1,525 0 0
Musselwhite & Sapp	1,689 0 0	J. May	1,500 0 0
Hewitt & Sons, Ltd.	1,644 16 10	A. Streeter & Co.	1,477 18 9
Smith & Sons	1,630 17 3	G. A. Franks	1,473 0 0
S. Atkins	1,607 0 0	Edwards & Co., London*	1,430 0 0
James & Hebburn	1,554 0 0		

HAMPTON.—For erecting a fire station at Hampton-hill, for the Urban District Council. Mr. S. H. Chambers, Surveyor, Public Offices, Hampton, Middlesex:—

J. & W. Drake	£525 0 0	J. Singleton & Sons	£438 0 0
Collinson & Co.	510 0 0	Lock Bros.	420 0 0
Cunningham & Co.	493 0 0	J. Wright & Sons	417 10 0
W. Shepherd	450 0 0	F. Smith	394 0 0
E. Potterton	445 0 0	H. J. Budd, 14, Beurfield-road, Kingston-on-Thames*	342 0 0
J. Barker & Co.	443 0 0		
Farrington & Read	438 17 8		

HANLEY.—For constructing four settling tanks 2,000,000 gallons total capacity, for the Corporation:—

C. Baker & Sons	£28,209 11 2	C. Cornes & Sons	£12,995 0 0
T. A. Macdonald	19,348 0 0	Ward & Betley	12,988 12 0
Ball & Robinson	16,715 0 0	G. Bell	12,948 0 0
Abraham Graham & Sons, Ltd.	16,135 0 0	J. Laing & Son	12,866 0 0
R. H. B. Neal, Ltd.	15,801 0 0	Smith & Co.	12,829 18 4
F. Mitchell & Son	15,232 11 0	Smedley & Booth	12,719 16 11
T. Smart	14,850 4 6	Sanders & Torrance	12,556 0 0
Bennie & Thompson	14,249 7 6	Whyte & Co.	12,446 8 7
G. G. Rayner	14,148 18 7	T. Egan & Sons	12,443 11 2
E. Boore	14,146 4 8	Currall, Lewis, & Martin	12,150 0 0
Muirhead, Greig, & Matthews	13,750 0 0	Loch, Andrews, & Price	11,884 17 1
O. Wright & Co.	13,607 13 4	Parker & Sharp	11,699 17 0
W. Morley & Sons	13,444 5 10	S. Wilton	11,657 0 0
H. E. Buckley	13,358 4 4	W. Underwood & Bro.	11,585 11 9
Johnson Bros.	13,306 12 4	F. Barke	11,566 0 0
G. F. Tomlinson	13,223 0 0	W. Brigg	11,500 0 0
A. Braithwaite & Co.	13,208 8 0	Tate & Gordon	11,449 6 5
J. Byrom & Co., Ltd.	13,006 15 5	W. Williams	11,100 0 0
		T. Godwin, Hanley*	10,863 0 0
		H. Holloway	10,637 16 3
		H. M. Nowell	10,619 0 0

Resolved:—That the tender of Mr. Thomas Godwin for the construction of sewage tanks and other works at the sewage works, amounting to £10,693, be accepted.

HARROGATE.—For Harrogate Post-office enlargement:—

			Credit.
F. Shepherd	£2,115 5 0	....	£22 0 0
Rudd & Son, Ltd.	2,080 0 0	....	25 0 0
W. Nicholson & Son	1,889 2 8	....	12 10 6
I. Gould, Ltd.	1,800 0 0	....	8 7 6
Oak Building Co., Ltd.	1,817 0 0	....	45 0 0
Stott & Alcock	1,765 0 0	....	—
W. Pearce	1,705 0 0	....	25 0 0
D. Gill & Son	1,657 0 0	....	13 0 0
Barker Bros.	1,541 6 6	....	26 10 0

IFFLEY.—For sewering, etc., works, for the Headington Rural District Council. Mr. H. H. Humphreys, engineer, 28, Victoria-street, Westminster. Quantities by engineer:—

E. E. Cousins	£2,698 10 8	Smith & Co.	£1,785 10 11
G. Henson	2,411 16 3	G. G. Rayner	1,780 0 0
T. Free & Co.	2,043 19 6	I. H. Macdonald	1,709 12 8
Langley, Hardy, & Johnson	2,010 0 0	Davies, Hall, & Co., Sheerness*	1,540 15 2

LEE.—For roadworks, part of Micheldever-road, Lee, for Lewisham Borough Council:—

Roadway.

Fry Bros., Greenwich £598 0 0

Footways.

Harvey Bros., 23, Victoria-street, S.W. 194 11 8

LONDON EDUCATION COMMITTEE TENDERS.

Bermondsey, "The Chaucer" (Partition).

J. Appleby & Sons	£143	J. Marsland & Sons	£117
J. F. Ford	129	Galbraith Bros.	112
W. J. Coleman & Co.	127	Holliday & Greenwood, Ltd.	108
W. Downs	124	T. D. Leng, Czar-street Works, Evelyn-street, Deptford*	96
W. V. Goad	120		
J. C. Chalkley	120		
W. H. Lascelles & Co.	118		

Bermondsey, Page's-walk (Division of rooms).

H. Bouneau	£252 10	Holliday & Greenwood, Ltd.	£223 0
W. J. Coleman & Co.	250 0	R. Johnson	221 0
W. Downs	242 0	Galbraith Bros.	210 0
J. Appleby & Sons	237 0	T. D. Leng	205 0
W. H. Lascelles & Co.	229 0	J. C. Chalkley	201 0
J. Marsland & Sons	228 0	K. Whitehead & Co., Ltd., Portland-place North, Clapham-road*	196 0

Bethnal Green, S.W., Virginia-road (Provision of Head Master's Room).

J. Stewart	£75 0 0	Vigor & Co.	£63 0 0
Parrott & Isom	69 0 0	A. E. Symes	63 0 0
W. H. Lascelles & Co.	68 0 0	J. T. Robey	62 0 0
Barrett & Power	65 0 0	Stevens Bros.	58 10 0
G. Barker	64 12 9	H. Line, 81, Peckham Rye*	55 0 0

Bow and Bromley, Alley-road (Timber store).

H. Groves	£75 0 0	F. & F. J. Wood	£68 0 0
Staines & Son	74 0 0	G. Barker	67 12 4
J. T. Robey	74 0 0	Vigor & Co., King-street, Poplar*	66 10 0
A. E. Symes	71 0 0		
Stevens Bros.	68 10 0		

City of London, Gravel-lane (Covered Playground).

Parrott & Isom	£179 0 0	Stevens Bros.	£140 10 0
W. H. Lascelles & Co.	160 0 0	Vigor & Co.	149 0 0
G. Barker	157 12 2	Barrett & Power	145 0 0
Staines & Son	157 0 0	Belcher & Co.	143 0 0
G. Munday & Sons	153 0 0	H. Line, 81, Peckham-rye*	119 0 0

Hackney, N., Wordsworth-road (Alterations).

E. Lawrance & Sons	£230 0	H. Bouneau	£198 0
G. S. S. Williams	211 0	McCormick & Sons	195 0
C. R. Price	210 0	J. Grover & Son	193 0
J. Stewart	209 15	W. H. Lascelles & Co., 121, Bunhill-row*	139 0
Barrett & Power	207 0		

Hackney, S. (Homerton Residential School for Mentally Defective Deaf Children).

C. R. Price	£155 10	J. Grover & Son	£127 0
J. Stewart	148 0	W. Lawrence & Son	123 10
L. H. & R. Roberts	148 0	Stevens Bros., 1a, Yonge-pk., Seven Sisters-road*	102 0
E. Lawrance & Sons	145 0		
G. S. S. Williams & Son	134 0		

Lewisham, Holbeach-road (School for Physically Defective Children).

Kirk & Randall	£349 0	H. Groves	£215 0
H. Bragg & Sons	311 0	Grace & Marsh	206 0
W. Akers & Co., Ltd.	259 0	J. & C. Bowyer	197 10
H. Leney & Son	245 0	Enness Bros., Erith, Kent*	192 0
T. D. Leng	232 0		

Poplar, Bromley-hall-road (Altering stepped flooring, etc).

E. Lawrance & Sons	£215 0	A. E. Symes	£165 0
G. Munday & Sons	198 0	Vigor & Co.	161 0
W. Martin	180 0	Stevens Bros., 1a, Yonge-park, Seven Sisters-road*	157 0
A. Porter	173 0		
H. Bouneau	172 10		

St. Pancras, N., Rhyl-street (Roofing over Fives-court).

Parrott & Isom	£129 0 0	W. H. Lascelles & Co.	£82 10 0
Barrett & Power	102 0 0	Belcher & Co.	77 15 0
G. Barker	101 9 6	H. Line, 81, Peckham-rye*	77 0 0
Vigor & Co.	93 15 0		
Stevens Bros.	91 0 0		
G. Munday & Son	85 0 0		

Stepney, Trafalgar-square (Additional Exit).

Parrott & Isom	£161	J. T. Robey	£151
Vigor & Co.	159	A. E. Symes, Carpenter's-road, Stratford*	146
W. H. Lascelles & Co.	159		
Turnbull & Son	157		

Woolwich, Powis-street (Special School).

W. Harris	£432	H. Groves	£356
Thomas & Edge	427	H. Line	333
E. P. Bulled & Co.	369	Enness Bros., Erith, Kent*	274
Vigor & Co.	365		
Kirk & Randall	363		

Greenwich, Blackheath-road (Heating).

Wippell, Bros., & Row	£139 10	Wenham & Waters, Ltd.	£109 18
Paragon Heating Co.	135 0	Palowkar & Sons	109 0
Stevens Bros.	132 10	Comyn, Ching, & Co., Ltd.	103 10
G. Davis	120 18	W. G. Cannon & Sons, 107, London-road, Southwark*	95 0
Brightside Foundry & Engineering Co., Ltd.	119 0		
J. Grundy	117 0		

Greenwich, Hughes-fields (Heating).

J. C. Christie	£153 10	J. Defries & Sons, Ltd.	£132 10
Clark, Bunnett, & Co., Ltd.	151 10	Stevens & Sons	125 0
T. S. Knight & Sons	146 0	Wenham & Waters, Ltd.	121 7
G. Davis	146 0	Palowkar & Sons, 90 and 91, Queen-street, Cheapside*	119 10
J. Gray	134 0		

Islington, S., Popham-road (Heating).

G. Davis	£120 10	J. Defries & Sons, Ltd.	£74 0
W. G. Cannon & Sons	118 0	J. Yetton & Co.	73 10
G. & E. Bradley	80 10	Wenham & Waters, Ltd., Paragon Works, Croydon*	69 5
Stevens & Sons	87 0		
Palowkar & Sons	79 0		
Brightside Foundry and Engineering Co., Ltd.	75 10		

Wandsworth, Merton-road (Heating).

T. S. Knight & Sons	£66 0	Wenham & Waters Ltd.	£49 16
G. Davis	64 0	Palowkar & Sons, 90 & 91, Queen-street, Cheapside*	40 0
W. Richardson & Co.	55 10		
J. Wontner-Smith	52 10		

Islington, N., Poole's-park (Scheme of Improvements).

E. Triggs	£13,224	L. Whitehead & Co., Ltd.	£8,649
G. S. S. Williams & Son	9,675	E. Lawrance & Sons	8,528
McCormick & Sons	9,523	L. H. & R. Roberts, 34, Rheidol-terrace, Islington*	‡
J. Grover & Son	9,373		
H. L. Holloway	8,946		‡
			8,296

[The architect's estimate comparable with these tenders is £7,627.]

LONDON.—For the erection of a new police-station and stable at Clapham, for the Receiver for the Metropolitan Police District. Mr. J. Dixon Butler, Architect and Surveyor to the Metropolitan Police, New Scotland Yard, S.W. Quantities by Messrs. Thurgood, Son, & Chidgey, Charing Cross-chambers, Duke-street, Adelphi, W.C.:—

J. H. Adamson	£13,050	F. & H. F. Higgs	£12,133
Lawrance & Sons	12,745	C. Ansell	12,006
Lathey Bros.	12,627	Higgs & Hill	11,994
F. G. Minter	12,550	Prestige & Co.	11,777
Grover & Son	12,420	Appleby & Sons	11,420
Mowlem & Co., Ltd.	12,390	Lovatt, Ltd.	10,510
Holloway Bros.	12,280		

LONDON.—For the rebuilding of Messrs. J. T. Bull & Son's offices and scene painting rooms, 134, New Kent-road, S.E. Mr. J. Halsted, Waterworth, architect and surveyor, 385, Queen's-road, New Cross Gate, S.E. Quantities by Mr. W. H. Smith, Great Winchester-street, E.C.:—

J. Barker & Co., Ltd.	£4,489	T. G. Sharpington, Machell-road Works, Nunhead, S.E.‡	£3,770
Sims & Woods	4,165	B. E. Nightingale	3,725
W. H. Lascelles & Co.	4,106	W. Sayer & Son	3,721
W. Johnson & Co., Ltd.	4,100	W. Wallis	3,699
M. Pearson	4,070	Battley, Sons, & Holness	3,573
T. D. Leng	4,012		
Larkin & Thomas	4,940		
Courtney & Fairbairn	3,863		

‡ Accepted subject to variation.

LONDON.—For new boiler-house and other work at the Anglo-American Laundry, Lower Tooting. Mr. S. J. Reynolds, engineer, Reigate. Quantities by Mr. J. Kennard, Croydon:—

Joselyne & Young	£1,398	W. Johnson & Co., Ltd.	£1,283
Hanscombe & Smith	1,394	J. C. Richards & Co.	1,275
D. W. Barker	1,344	W. & C. Brown, Earlsfield*	1,230
Akers & Co., Ltd.	1,337		
W. Taylor & Co.	1,293		

LONDON.—For hydrants, for the London County Council:—

	Price for a complete single hydrant.	Price for a complete double hydrant.
	£ s. d.	£ s. d.
A. L. Thomas & Sons, Ltd.	4 15 0	9 10 0
Highton & Co.	4 4 6	7 17 6
Glenfield & Kennedy, Ltd.	3 12 9	6 15 6
Parsons & Wills	3 0 0	6 15 0
Railway & General Engineering Co., Ltd.	3 0 0	6 0 0
T. Lister & Co., Brassfounders, Ltd.	2 7 0	4 16 6
G. Napier & Sons, Ltd.	2 0 6	4 4 6
J. Blakeborough & Sons	1 17 6	4 0 0
Ham, Baker, & Co., Ltd., 13, Grosvenor-road, S.W.*	1 17 0	3 15 0

LONDON.—For the supply of conductor tee-rails, for the London County Council:—

Steel, Peech, & Tozer, Ltd.	£9,050 0
P. & W. MacLellan, Ltd.	8,612 10
Bolckow, Vaughan, & Co., Ltd.	8,550 0
Frodingham Iron and Steel Co., Ltd., Frodingham, near Doncaster*	8,250 0

LONDON.—For the erection of Poplar car-shed, for the London County Council:—

C. Yates & Co.	£32,994 0 0	T. Rowbotham	£32,197 0 0
F. & G. Foster	29,100 0 0	G. Munday & Sons	31,565 0 0
H. Kent	29,020 0 0	A. Hudson & Co.	31,536 0 0
A. Faulks	35,836 2 7	H. Lovatt, Ltd.	31,282 0 0
Kirk & Randall	35,637 0 0	F. & A. Willmott	31,082 0 0
W. H. Hyde	35,566 0 0	B. E. Nightingale	30,420 0 0
Martin, Wells, & Co., Ltd.	34,400 0 0	J. & C. Bowyer	30,258 0 0
Perry & Co.	33,875 0 0	Holloway Bros. (London), Ltd.	30,190 0 0
F. & H. Higgs	32,750 0 0	C. Wall, Ltd., London*	29,006 0 0
J. Shelbourne & Co.	32,487 0 0		
Rowley Bros.	32,349 0 0		
Holliday & Greenwood, Ltd.	32,333 0 0		
F. & T. Thorne	32,200 0 0		

[The architect's estimate comparable with the tenders is £29,500.]

LONDON.—For reconstruction of Denmark-hill bridge, for the London County Council:—

W. Moss & Son, Ltd.	£7,999 12 0
J. Strachan	6,490 0 0
Pedrette & Co.	6,216 9 0
Westminster Construction Co., Ltd.	5,658 14 10
A. Thorne	5,594 18 7
Heenan & Froude, Ltd.	5,366 16 2
J. Jackson & Co.	5,334 4 9
S. Kavanagh & Co.	5,265 16 9
Wilkinson Bros.	5,223 0 0
Tilbury Contracting and Dredging Co., Ltd.	5,059 19 9
G. Hay & Co.	5,029 9 2
Muirhead, Greig, & Matthews	5,010 2 4
A. Fasey & Son, London*	4,961 5 0
H. Woodham & Son	4,959 14 4
Johnson & Langley‡	4,868 5 0

‡ Withdrawn.

NEW MALDEN.—For the making up of Albemarle-gardens, for Mr. Thomas B. Simmons, Engineer and Surveyor, New Malden, Surrey:—

S. Atkins	£760 5 0	Harris & Co.	£585 0 0
Shelbourne & Co.	640 0 0	Kavanagh & Co.	577 0 0
R. W. Swaker	634 0 0	T. Free & Son, Maidenhead*	573 5 7
Cunningham, Forbes, & Co.	632 1 3	Streeter & Co.	479 0 0

POTTERS BAR.—For road improvements, for South Mimms Rural District Council. Mr. W. H. Mansbridge, Surveyor, 40, High-street, Barnet. No quantities:—

Grounds & Co.	£1,063 10 0	Worboys	£700 0 0
Ford	881 0 0	Rayner	668 0 0
Mann	821 1 8	Tudor	637 3 7
Adams	820 0 0	Davies	531 18 0
Bell	813 0 0	Wheeler*	496 10 0
Killingback	701 0 0		

PLYMOUTH.—For erecting a police and fire station at Prince Rock, for the Corporation. Mr. James Paton, Borough Engineer and Surveyor, Plymouth:—

Wakeham Bros.	£1,985 0 0	Steer & Pearce	£1,730 16 3
H. J. Allen	1,918 18 0	A. C. Jones	1,705 0 0
W. R. Blake	1,918 0 0	S. Roberts	1,699 17 7
W. E. Bennett	1,017 0 0	Pearce Bros.	1,668 18 0
F. J. Stanbury	1,872 14 0	A. N. Coles, New Town Chas, Plymouth*	1,618 0 0
A. Andrews	1,777 0 0		

[Engineer's estimate, £1,705.]

SLEAFORD.—For a waterwheel and pump, for the Urban District Council. Mr. Jesse Clare, Surveyor, Sleaford:—

A. Dodman & Co.	£454 0 0
Wakes & Lamb	287 10 0
J. Wolstenholme & Son	254 15 0
A. Mather & Son	237 0 0
Hayward, Tyler, & Co.	196 11 0
Goddard & Massey	195 5 6
W. Antrobus	174 7 6
J. W. Grimsley & Co.	161 8 6
G. Gilkes & Co., Kendal	156 8 6

SWINESHEAD.—For decorating and general repairs at Park House, Swineshead, near Boston, Lincs., for Mr. A. J. Sole. Messrs. J. G. Stallebrass & Sons, architects and surveyors, North-street, Peterborough. Quantities by architects:—

F. Mawer	£461 0 0	Copper & Son	£335 0 0
Barron & Co.	413 0 0	G. T. Shearman	333 16 0
F. Nichols	397 15 0	E. English, Peterborough*	265 10 0
Sparrow & Son	374 0 0	C. Illett	240 10 0
D. Mackears	363 0 0	W. Brummitt	151 4 0
H. Pattinson	360 9 4	R. Bradley	135 0 0
W. Read	352 0 0		
T. Long	349 0 0		

THORNTON.—For erecting two through houses at Mountain, Thornton. Messrs. John Drake & Son, architects, Queensbury. Quantities by architects:—

Mason: W. Drake, Queensbury	£373 10 0
Joiners: J. Banstow & Son, Queensbury	126 0 0
Slater: A. Blakbrough, Bradshaw	21 0 0
Plasterers: Mudd & Sidswell, Thornton	33 3 4
Plumber: W. Hodgson, Queensbury	83 10 0
Painter: J. Varley & Son, Thornton	14 17 0

WATERING.—For erecting two villas. Mr. John Mutton, architect, Charlestown, St. Austell:—

J. Bunt, St. Austell	£380 0 0

WHADDON.—For rebuilding Whaddon Vicarage, near Royston. Mr. W. Milner Fawcett, M.A., architect, Cambridge:—

Taylor	£1,600	Jacklin	£1,480
Gimson	1,524	Wade, S. Neots*	1,452

J. J. ETRIDGE, Jr.

SLATE MERCHANT,

SLATER & TILER.

Penrhyn-Bangor, Oakeley-Portmadoc,

and every other description of Slates, except American, ready for immediate delivery to any railway station.

Red Sandfaced Nibbed Roofing Tiles always in Stock.

Applications for Prices, etc., to

BETHNAL GREEN SLATE WORKS,
Bethnal Green, London, E.

The BATH STONE FIRMS, Ltd., BATH.

For all the Proved Kinds of

BATH STONE.

FLUATE, for Hardening, Waterproofing, and Preserving Building Materials.

HAM HILL STONE. DOULTING STONE.

The Ham Hill and Doulting Stone Co., Limited (Incorporating the Ham Hill Stone Co. and C. Trask and Son, The Doulting Stone Co.).

Chief Office:—Norton, Stoke-under-Ham, Somerset.

London Agent:—Mr. E. A. Williams, 16, Craven-street, Strand.

Asphalte.—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 42, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds and milk-rooms, granaries, tun-rooms, and terraces. Asphalte Contractors to the Forth Bridge Co.

SPRAGUE & CO., Ltd.,

LITHOGRAPHERS,

Employ a large and efficient Staff especially for Bills of Quantities, &c.

4 & 5, East Harding-st., Fetter-lane, E.C.

QUANTITIES, etc., LITHOGRAPHED accurately and with despatch. [Telephone No. 434 Westminster.

METCHIM & SON { 3, PRINCES STREET, S.W., and 22, CLEMENT'S LANE, E.C.

"QUANTITY SURVEYORS' DIARY & TABLES," For 1906, price 6d., post 7d. In leather, 1/-, post 1/1.

GRICE & CO., STONE MERCHANTS,

ADDISON WHARF, 191, Warwick Rd., KENSINGTON,

FOR ALL THE BEST

Building & Monumental Stone

A LARGE STOCK OF BEST

CAEN Stone { For HOME TRADE and EXPORT.

in Block, Slab, and Scantling.

ASPHALTE

For Horizontal & Vertical Damp Courses.

For Flat Roofs, Basements, & other Floors.

Special attention is given to the above by

THE

French Asphalte Co.

CONTRACTORS TO

H.M. Office of Works, The School Board for London, &c

For estimates, quotations, and all information apply at the Offices of the Company.

5, LAURENCE POUNTNEY HILL, CANNON STREET, E.C.

"Drop Dry" Glazing

ECONOMICAL, EFFECTIVE. THE PERFECT SELF-SUSTAINING BAR.

Copper & Zinc Roofing.

The most Efficient and Economical System in the Kingdom.

Designs and Estimates Free on Application.

Telegraphic Address: "COURTEOUS, LONDON."

F. BRABY & CO., LTD.

Telephones: Nos. 783 and 457 North.

Chief Offices: 352-364, EUSTON ROAD, LONDON, N.W.

Works: LONDON, LIVERPOOL, BRISTOL, GLASGOW, FALKIRK.